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Analysis of Agricultural Land Classification in East Kotawaringin District, Central Kalimantan Province, using Landsat 8-OLI Image

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Abstract:

Purpose:
This research aims to map agricultural land in East Kotawaringin Regency, Kalimantan Province, and analyze it using Landsat 8 OLI satellite imagery in 2023.

Methodology:
The method used in this research is supervised classification, which will then carry out a data analysis process related to natural conditions in the field. Based on the results of satellite image data processing, there are five categories of land cover classification in the East Kotawaringin Regency area: built-up land, empty land, fields/moors, gardens and forests.

Findings:
According to the accuracy test results, the overall accuracy value of satellite imagery in East Kotawaringin Regency is 87%. Community activities, such as economic activities and meeting needs for public facilities and housing, influence the distribution of existing land cover areas.

Implication:
The classification results obtained later through maps of agricultural land in East Kotawaringin Regency can be used to find various studies, especially on expanding the agricultural sector.

INTRODUCTION

East Kotawaringin Regency is one of the districts in Central Kalimantan Province, with an area of 16 796 km2 (10.94% of the total area of Central Kalimantan Province). The capital of East Kotawaringin district itself is Sampit. This district has an average annual air temperature of 20.60□ C to 34.80°C, close to the 0°C latitude point, so the weather tends to be hot. 50% of the land use area in East Kotawaringin Regency is dominated by forest areas (BPS et al., 2022).

Land cover is the appearance of physical materials on the face of the earth. This land cover identifies the relationship between natural and social processes in the surrounding community. Land cover can be used as a provider of information for modeling and understanding natural phenomena occurring on the Earth. According to Degrees et al. (2020), land cover data can also be used to study climate change and the relationship between human activities and global change. The accuracy of land cover information is essential in improving the performance of ecosystem, atmospheric and hydrological models.

Land cover in the agricultural sector plays an important role, as does the study of expanding rice fields. The goal is to increase food security. It is different from East Kotawaringin, where most of the land is forest, so there has been a lot of land change due to the development of food estate areas (Noor et al., 2023). The latest land cover information can be obtained through remote sensing, which produces maps. Remote sensing has long been an

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effective means for monitoring land cover through its ability to provide information on spatial diversity on the earth's surface widely, quickly, easily and precisely.

Remote sensing is a science and art that can obtain information about objects, areas and phenomena through data analysis through devices without directly contacting the objects, areas and phenomena being observed (Rahman et al., 2022). According to Tatisina et al. (2020) explained that remote sensing technology can be used to monitor land use and changes in land cover used over time. This technology has the advantage that the data covers a wide area, has good accuracy because it can tap land surface objects in detail using high-resolution imagery and is more economical. Data obtained using remote sensing is better than information from relevant government agencies because the remote sensing satellite data used can be the latest recording results. Usually, Landsat satellite data is used to classify land cover, as in the agricultural sector, which has been widely used for rice fields and forests to determine the land area and production results.

Based on the results of research conducted by Saswita (2023), the results of mapping using Landsat 8-OLI imagery on agricultural land in the Pariaman Regency area yielded information that there was a reduction in the area of rice fields, which affected the production of rice in the district. This is because there has been an increase in the area of built-up land compared to other types of land use. In line with this, research results from Putri & Iswandi (2023) also reveal that the reduction in agricultural land area is influenced by increasing population growth, resulting in changes in the built-up land.

Pratama and Riana (2022) explain that remote sensing technology can be used in various sectors, especially in managing natural resources, environmental management and agricultural land. His research using image processing through a supervised method showed an overall accuracy of 100%. Further research conducted by Zulfikar (2021) using Landsat 8 imagery with the Maximum Likelihood method resulted in a superior accuracy of 87.56% compared to Minimum Distance with a value of 79.3%. The research results in West Bandung Regency revealed that the most significant land area was secondary forest (33.5%), followed by residential land (14.8%). Landsat 8 OLI imagery in the agricultural sector can monitor environmental developments and control the balance between humans and the environment (Kusuma et al., 2021). This research focuses on using Landsat 8-OLI imagery. It is hoped that it will be able to obtain accurate and appropriate land use interpretation results so that the data obtained can be used as a reference for knowing land use in East Kotawaringin Regency, the main focus of which is on mapping agricultural land such as oil palm plantations, forests, moorlands/fields, empty land, and built-up land.

Based on the description previously explained, this research aims to map agricultural land in East Kotawaringin Regency, Kalimantan Province. 2023, this land will be analyzed using Landsat 8 OLI satellite imagery. The classification results obtained later through maps of agricultural land in East Kotawaringin Regency can be used to inform various studies, mainly for expansion in the agricultural sector.

METHODS

Research Sites. Astronomically, East Kotawaringin Regency is located between 1120 7' 29" East Longitude and 1130 14' 22" East Longitude and between 10 11' 50" South Latitude and 30 18' 51" South Latitude. Based on its geographical position, East Kotawaringin Regency borders Seruyan Regency in the west, Katingan Regency in the north to the east, and the Java Sea in the South. The population of East Kotawaringin Regency in 2022 will be 436,079, consisting of 226,064 male and 210,015 female residents. The dominant soil type in East Kotawaringin Regency is the red and yellow podzolic type. However, other soil types are also found in some parts, such as alluvial, organosol, and lithosol. Below is a map of East Kotawaringin Regency in Figure 1.

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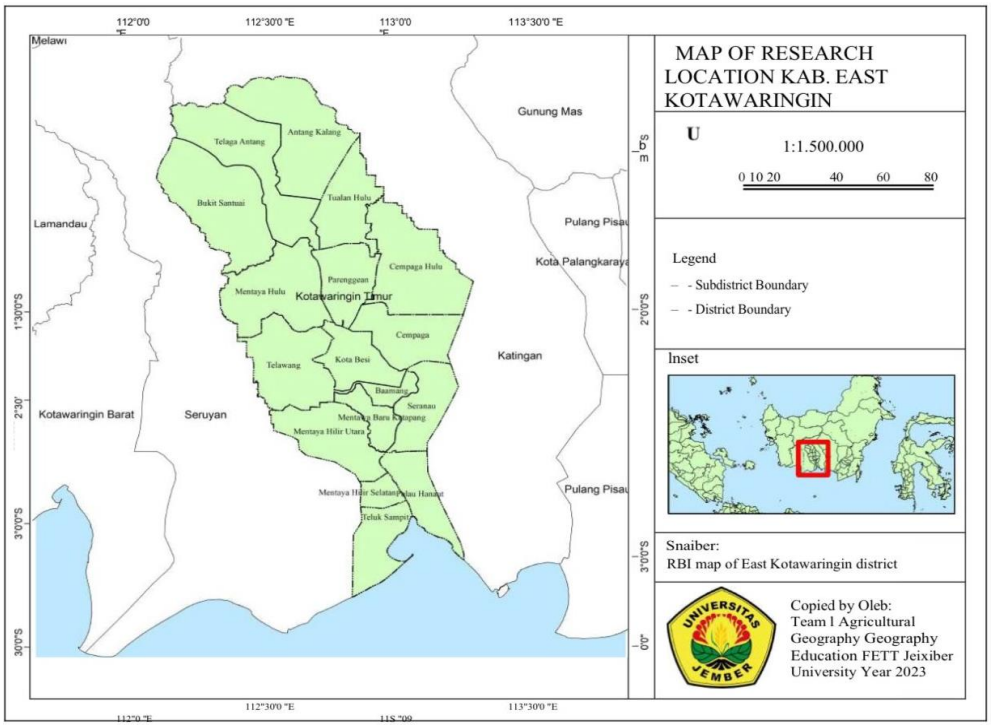

Figure 1. Map of the East Kotawaringin Research Location

Research Tools and Materials. This research used 2023 Landsat 8 imagery obtained from the USGS. Researchers used land suitability analysis for agriculture and overlay analysis of suitability for land use.

Land Cover Image Classification Method. Image classification is the process of arranging and grouping all pixels in the image band in question into several classes based on the criteria of an object to produce a product in the form of a thematic map in the form of a raster. In general, there are two groups for categorizing digital images, namely supervised classification methods and unsupervised classification methods. The aim of categorizing digital images is to identify the spectral appearance of objects.

The supervised method begins with determining several samples from each land cover class (training area). In this study, there were five classes and 38 accuracy test points. Training areas are defined as land cover class objects input into the classification (Hamdir, 2014). The advantages of supervised classification are that it controls land cover class information based on training samples and classification accuracy. Meanwhile, the disadvantages are that data interpretation is forced, the selection of training samples is not necessarily representative, and there are unidentified spectral classes.

Supervised classification is a method for transforming the multispectral satellite image data into spatial element classes such as settlement areas, empty land, water bodies, vegetation and others (Sinaga et al., 2018). This research carried out several steps, namely the stages before image processing (preparing tools and materials), image interpretation, and creating image classification class characteristics. The Landsat 8 OLI image used for this research area was obtained from the USGS website. Then, the data is processed through ENVI 4.5 to classify supervised with the Maximum Likelihood category. Maximum Likelihood classification is defined as a classification that indicates that the statistics for each class in each band are typically distributed and calculates the probability that each given pixel belongs to a particular class (Rini, 2018). Next, an accurate test will be carried out with an accuracy threshold of 80%.

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Next, image interpretation is carried out based on spatial recognition of the object's characteristics. These characteristics can be recognized through interpretation elements such as shape, pattern, color, size, shadow, texture, location, association and use of the RBI map. Class characteristics are also needed in classification, which can be obtained from the training area. According to Sampurno (2016), training areas, such as forests, rice fields and built-up land, can represent one land cover class.

RESULTS AND DISCUSSION

Image Interpretation. Based on Landsat 8 image interpretation results in East Kotawaringin Regency in 2023 using the best band combination to produce land cover maps, five land cover classes are identified based on visual observations of objects in the field. The cover classes include oil palm plantations, forests, moorland/fields, built-up and empty land. The following is a picture of the land classification in East Kotawaringin Regency, which is presented in Figure 2.

Figure 2. Examples of the appearance of objects on the earth's surface are a) built-up land, b) empty land, c) moorland/fields, d) oil palm plantations and e) forests

Figure 2 is the appearance of an earth's surface object with a combination of 432 Landsat 8 OLI bands. The image interpretation is based on hue/color, pattern, texture, shape, size and association. The appearance of different colors in the image interprets differences in land cover in the identified areas. The red color in the image represents built-up land, which is dominated by residents' houses, and there are also public service facilities such as hospitals, schools and places of worship. This color is mainly spread in the center of East Kotawaringin Regency and other areas. The yellow color shows that there is still empty and undeveloped land in East Kotawaringin Regency. The existing empty land comes from former mining excavations and former forest logging. The cream color indicates the presence of fields/moors, mainly located around the center of East Kotawaringin Regency or surrounding built-up land. The light green color on the map represents oil palm plantations, most of which are located in the southeastern part of East Kotawaringin Regency.

Meanwhile, the dark green color on the map represents forests spread across most corners of East Kotawaringin Regency. The degree of brightness of the green color on the land cover map interprets the level of vegetation density (Derajat et al., 2020). The dark green color indicates a high level of vegetation density (forest), and the lighter green color indicates mixed forest areas.

Based on the analysis results described in Figure 2, the total area of East Kotawaringin Regency, classified as agricultural land, is 1,583,685 ha. The most dominant land is forested, with an area of 617 269 ha; then there are moorland/farm areas, with 388 257 ha. Next is an oil palm plantation area with an area of 286 510 ha, then built-up land with an area of 191 883 ha. Finally, there is empty land covering an area of 99 766 ha. The following table shows the results of the distribution of agricultural land in East Kotawaringin Regency in Table 1.

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Table 1. Area of Agricultural Land Distribution in East Kotawaringin Regency

Number	Land	Wide (ha)
1.	Palm Oil Plantation	286.510
2.	Forest	617.269
3.	Moorland/Field	388.257
4.	Built Up Land	191.883
5.	Empty land	99.766
	Total	**1.583.685**

Source: Processing Data, 2023

Land Cover Classification from OLI-8 Data in East Kotawaringin Regency. East Kotawaringin Regency is one of the districts in Central Kalimantan Province that have been in the spotlight due to significant forest loss over the last decade. The loss of forests in this district affects changes in the configuration of the forest landscape (Saka et al., 2024). Observation results show that forest cover in East Kotawaringin Regency has decreased in area, followed by an increase in the area of other types of land cover. The land cover with the largest area in 2023 in East Kotawaringin Regency is oil palm plantation cover (Hakim, 2021). Data from Central Kalimantan province shows that the East Kotawaringin district owns the area with the most significant oil palm land. The total land area 2018 was 411101.4 Ha (Bintariningtyas & Juwita, 2021). The following are the results of the land cover map for East Kotawaringin Regency in 2023, presented in Figure 3.

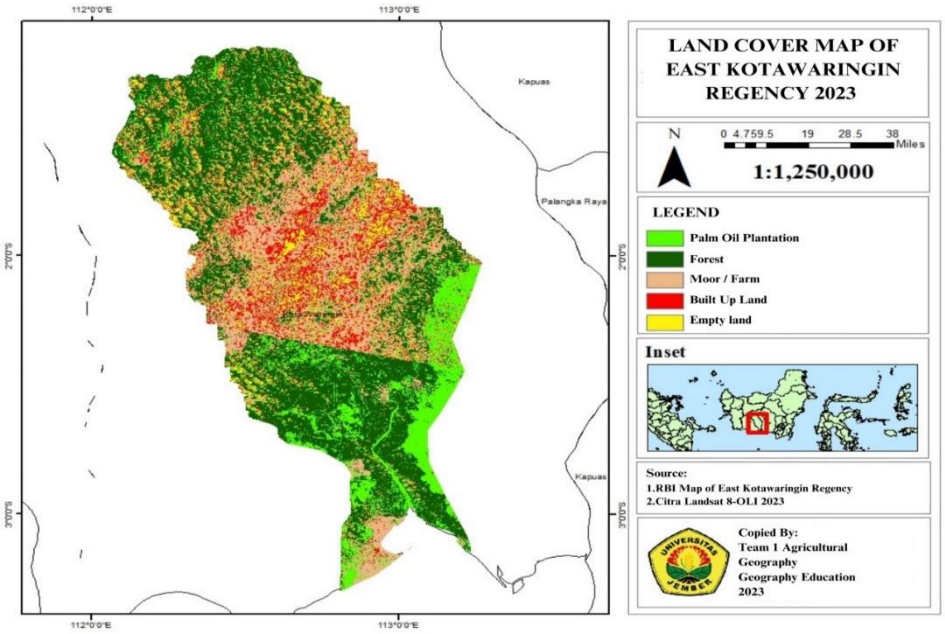

Figure 3. Land Cover Map of East Kotawaringin Regency in 2023

Based on Figure 3 above from the interpretation of Landsat 8 imagery, visually observing the correctness of land cover objects in the field in East Kotawaringin Regency is identified into five land cover classes. The land

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cover classes consist of oil palm plantations, forests, moorlands/farms, built-up land, and empty land (Harum et al., 2024). The appearance of land cover types in the image is displayed in different colors; for example, the appearance of oil palm plantations is colored light green, and the appearance of built-up land is colored red.

The OLI land classification data results show that the northern parts, such as the Antang Kalang, Telaga Antang and Bukit Santuai areas, are mostly dominated by oil palm plantations and forests. However, there are few areas of built-up land. The eastern region, which includes the Cempaga Hulu, Parenggean, Tualan Hulu, and Besi City areas, is mainly dominated by moorland/fields, with a spread of built-up land. This area is most dominated by moorland and built-up land and the area with the least oil palm plantations and forests. There are only a few oil palm plantations and forests in the eastern part of Cempaga and the easternmost area of Cempaga Hulu. There is also empty land cover scattered around Cempaga Hulu.

The western region of East Kotawaringin Regency, which includes the Telawang and Mentaya Hulu areas, is the same as the eastern region of East Kotawaringin Regency in that it is still dominated by moorland/fields, and there is a relatively dense distribution of built-up land. Forest land cover is only found in the Mentaya Hulu area. Vacant land cover is also spread around the area. The Southern region, which includes the Baamang, Seranau, Mentawa Baru/Ketapang, North Mentaya Hilir, Hanaut Island, and South Mentaya Hilir areas, is dominated by the land cover of oil palm plantations and forests with a spread of built-up land. Based on the potential value of land capacity, the Seranau sub-district is a very strategic sub-district that will be developed as a center for the growth and distribution of residential areas. However, if seen from the geographical aspect and availability of facilities, there are obstacles, so the development of urban areas is more focused on the Baamang area (Hidayat et al., 2023). The most land cover for oil palm plantations is in the eastern region of Hanaut Island. Meanwhile, the Sampit Bay region is the most different area from other parts of the South, most of which are dominated by forest land cover and oil palm plantations. However, the Sampit Bay area is dominated by moorland/farmland cover, and needs to be more built-up land cover is scattered around it.

Land classification in the East Kotawaringin Regency area uses accuracy tests. Accuracy testing is one of the stages of testing the level of accuracy of usage maps obtained from the digital classification process (Wulansari, 2017). This accuracy test aims to discover errors that might occur in a classification so that you can obtain a percentage of accuracy (accuracy) from the classification results later. Previous research conducted by Zylshal et al. (2016) on the island of Kalimantan obtained an overall accuracy of 77.65% covering 14 cover or land use classes. The results of the accuracy test in the East Kotawaringin Regency area are as follows:

Table 2. Accuracy Test of Land Classification in East Kotawaringin Regency

Classification and Regression							
User Class/Sample	**Built Up Land**	**Empty Land**	**Forest**	**Palm Oil Plantation**	**Moorland/ Field**	**Amount**	**User's Accuracy**
Built Up Land	3	0	0	0	0	3	100%
Empty land	0	7	0	0	0	7	100%
Forest	0	1	9	0	0	10	90%
Palm Oil Plantation	0	1	0	8	1	10	80%
Moorland/Field	0	0	1	1	6	8	7%
Amount	3	9	10	9	7	38	
Producer Accuracy	100%	78%	90%	89%	86%		
Overall Accuracy				87%			

Source: Data Processing Results, 2023

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Table 2 shows that the highest accuracy is in the built land use class, with an accuracy level of 100% in the Producer Accuracy results. In the User's Accuracy results in the table, the accuracy level is the same, namely 100%, which means the results of land classification carried out using Landsat imagery. 8-OLI has an excellent level of accuracy. Producer accuracy is the level of accuracy of image interpretation results for each land cover class. In contrast, the user's accuracy is the accuracy of field survey results for each land cover class. The lowest level of accuracy is found in the empty land class, namely with an accuracy level of 78% in the Producer Accuracy value. In comparison, in the User's Accuracy, the accuracy level is 100%. It means that the level of accuracy in carrying out classification is still lacking or the level of accuracy is lacking.

Based on this table, the overall accuracy value in this study is 87%, which means that the accuracy test results in the classification are in the excellent category. It follows Sutanto's statement in Herdianta & Kamal (2017) that accuracy references are considered suitable for using satellite imagery; they are 85% -90%. Previous research conducted by Lestari et al. (2021) in Lamandau Regency, South Kalimantan, shows overall accuracy results of 92.40% with an accuracy requirements interpretation of 85. This research also informs that the most widely used agricultural land is in the oil palm plantation class, the value of which reaches 97.64%.

Utilization of Agricultural Land Use in East Kotawaringin Regency. Agricultural land use in 2023 in East Kotawaringin Regency will be developed by considering field conditions, including soil type, topography and local climate factors, to maximize crop yields and support agricultural sustainability. The East Kotawaringin Regency Agriculture Service resulted from a merger of the Food Crop and Horticulture Agriculture Service, which was merged with the Animal Husbandry Service in 2011. Several general factors that influence agricultural potential in East Kotawaringin Regency include the condition of fertile soil, which is rich in nutrients and a favorable climate. According to the type of plant cultivated, sufficient water sources for irrigation and environmental sustainability increase the long-term potential for agricultural potential (Jaya, 2020).

According to work indicators from the East Kotawaringin District Agriculture Service, agricultural land in the district is planted with food crops: rice, corn, soybeans, cassava, sweet potatoes, peanuts and green beans. Besides food crops, horticultural crops, namely vegetables and fruit, are also produced. Food crops such as rice, corn, soybeans and sweet potatoes in the East Kotawaringin district are usually grown to meet local and basic food needs. Horticultural crops such as vegetables and fruit on East Kotawaringin agricultural land supply local and outside markets. Horticultural plants include several types of vegetables, fruit and ornamental plants, which often have specific potential depending on several specific factors and can support the potential of horticultural plants in a region (Arumningtyas, 2021).

The success of the agricultural sector, especially in the field of horticulture, of course, cannot be separated from the role of extension activities that agricultural instructors have carried out to increase the quality and quantity of productivity crops by increasing the knowledge and expertise of farmers (Asyrofi, 2023). The agricultural sector in East Kotawaringin Regency certainly has great potential to be developed and can even support the economy of the people in the region. Community interest in East Kotawaringin Regency in the agricultural sector continues to increase, which is in line with government and regional efforts to encourage the revival of this sector while supporting national and regional food security.

CONCLUSION

Based on the results of Landsat 8 image interpretation in East Kotawaringin Regency in 2023 by utilizing the best band combination to produce a land cover map, there are five land cover classes identified, namely oil palm plantations, forests, moors/farms, built-up land, and empty land. The OLI land classification data results show that the northern parts, such as the Antang Kalang, Telaga Antang and Bukit Santuai areas, are mostly dominated by oil palm plantations and forests. However, there are a few areas of built-up land. The eastern region,

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which includes the areas of Cempaga Hulu, Parenggean, Tualan Hulu, and Kota Besi, is mainly dominated by moorland/fields, with the distribution of built-up land there is also empty land cover scattered around Cempaga Hulu. The western region of East Kotawaringin Regency, which includes the Telawang and Mentaya Hulu areas, is the same as the eastern region of East Kotawaringin Regency in that it is still dominated by moorland/fields, and there is a relatively dense distribution of built-up land.

Meanwhile, the Southern Region, which includes the areas of Baamang, Seranau, Mentawa Baru/Ketapang, North Mentaya Hilir, Hanaut Island, and South Mentaya Hilir, is dominated by the land cover of oil palm plantations and forests such as in the East Kotawaringin district area. According to the accuracy test results, the overall accuracy value of satellite imagery in East Kotawaringin Regency is 87%, which means the classification results are declared suitable for using agricultural land in the Kotawaringin Regency area. According to work indicators from the East Kotawaringin District Agriculture Service, much of the agricultural land in the district is planted with food crops and horticultural crops such as vegetables and fruit.

REFERENCES

Arumingtyas, E. L., Mastuti, R., & Hakim, L. (2021). *Biologi Tanaman Hortikultura*. Malang: Universitas Brawijaya Press.

Asyrofi, M. F. (2023). Aplikasi Penyuluhan Pertanian Tanaman Hortikultura Berbasis Android (Studi Kasus UPT. Balai Penyuluhan Pertanıan Kecamatan Bantan Kabupaten Bengkalis) (Doctoral dissertation, Politeknik Negeri Bengkalis).

Bintariningtyas, S., & Juwita, A. H. (2021). Perkebunan Kelapa Sawit dalam Pengentasan Kemiskinan di Provinsi Kalimantan Tengah. *In Forum Ekonomi. 23*(2): 199-205.

BPS Kabupaten Kotawaringin Timur. (2022). Kabupaten Kotawaringin Timur dalam Angka 2022-Kotawaringin Timur Regency in Figures 2022. Kotawaringin Timur: BPS Kabupaten Kotawaringin Timur.

Derajat, R. M., Sopariah, Y., Aprilianti, S., Taruna, A. C., Aria, H., Tisna, R., Ridwana, R., & Sugandi, D. (2020). Klasifikasi Tutupan Lahan menggunakan Citra Landsat 8 Operational Land Imager (OLI) di Kecamatan Pangandaran. *Jurnal Samudra Geografi. 03*(01): 1–10. https://doi.org/10.33059/jsg.v3i1.1985

Hakim, A. R. (2021). *Dinamika Konfigurasi Lanskap Hutan Kabupaten Kotawaringin Timur, Kalimantan Tengah*. (Doctoral dissertation, Universitas Gadjah Mada).

Harum, L. P., Dharmanegara, I. A., & Jayawarsa, A. K. (2024). The Influence of Stress, Discipline and Environment on Employee Performance in Emporio Architects Bali. *Loka: Journal Of Environmental Sciences, 1*(1), 18-23.

Herdianta, S. D., & Kamal, M. (2017). Perbandingan Model Estimasi Kandungan Nitrogen padi Menggunakan Citra Hiperspektral dan Multispektral Sebagian Wilayah Kabupaten Sleman. *Jurnal Bumi Indonesia. 6*(3).

Hidayat, J. T., Syahbandar, M. Y., & Ihsan, M. J. (2023). Analisis Kesesuaian Lahan Permukaan di Kawasan Perkotaan Kota Sampit Kabupaten Kotawaringin Timur. *Jurnal Cahaya Mandalika. 3*(1): (172-181).

Jaya, E, R D. (2020). *Pencanangan Pengembangan Kawasan Agrowisata di Kelurahan Tanah Mas Kecamatan Baamang Kabupaten Kotawaringin Timur Provinsi Kalimantan Tengah.* (Doctoral dissertation, Universitas Muhammadiyah Palangkaraya).

Kabupaten Kotawaringin Timur dalam Angka 2023. (2023). BPS Kabupaten Kotawaringin Timur/BPS-Statistics of Kotawaringin Timur Regency. Kotawaringin Timur: CV Greenery.

Kusuma, B. A., Purwadi, P., & Marcos, H. (2021). Pelatihan Klasifikasi Tutupan Lahan sebagai Teknologi Penginderaan Jarak Jauh untuk Pemantauan Lahan Pertanian di Kabupaten Banyumas. *Community Engagement and Emergence Journal (CEEJ). 2*(1): 28-35. https://doi.org/10.37385/ceej.v2i1.122

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E-ISSN - 2986-3023 (ONLINE)
LOKA: JOURNAL OF ENVIRONMENTAL SCIENCES
Indexed By : GARUDA Google ISJD EBSCO

Lestari, N. A., Ridwan, I., & Fahruddin, F. (2021). Identifikasi Penggunaan Lahan Menggunakan Metode Klasifikasi Maksimum Likelihood pada Citra Satelit Landsat 8 OLI/TIRS di Kabupaten Lamandau Provinsi Kalimantan Selatan Tengah. *Jurnal Natural Scientiae. 1*(1): 29-34. https://doi.org/10.20527/jns.v1i1.4426

Noor, M., Sukarman, S., Masganti, M., Hairani, A., Khairullah, I., & Alwi, M. (2023). Lima Puluh Tiga Tahun Penelitian dan Pengembangan Lahan Rawa untuk Pertanian dan Produksi Pangan. *Jurnal Sumberdaya Lahan. 16*(2): 111-118. https://doi.org/10.21082/jsdl.v16n2.2022.111-118

Pratama, M. R., & Riana, D. (2022). Klasifikasi Penutupan Lahan Menggunakan Google Earth Engine dengan Metode Klasifikasi Terbimbing pada Wilayah Penajam Paser Utara. *JUPITER (Jurnal Penelitian Ilmu Dan Teknik Komputer). 14*(2-c): 637-650.

Putri, A. E., & Iswandi, U. (2023). Analisis Daya Dukung Lahan Pertanian Pangan (Padi) di Kabupaten Padang Pariaman. *Jurnal Pendidikan Tambusai. 7(*3): 22481-22488.

Rahman, D. R., Sandrawati, A., & Siswanto, Y. (2022). Identifikasi Penggunaan Lahan dan Analisis Kesesuaian Pola Ruang Menggunakan Citra Landsat 8 OLI 2020 (Studi Kasus: Sub-DAS Cikeruh, Citarik, dan Cirasea). *Journal of Soil Science & Environment/Jurnal Ilmu Tanah dan Lingkungan. 24*(2): 79–86. https://doi.org/10.29244/jitl.24.2.79-86

Saka, I. M. A. H. T., Suriani, N. N., & Yogiarta, I. M. (2024). The Influence of Financial Compensation, Work Motivation and Job Stress on Employee Performance at the Prama Sanur Beach Hotel. *Loka: Journal Of Environmental Sciences, 1*(1), 31-35.

Sampurno, R. M., & Thoriq, A. (2016). Klasifikasi Tutupan Lahan Menggunakan Citra Landsat 8 Operational Land Imager (OLI) di Kabupaten Sumedang (Land Cover Classification Using Landsat 8 Operational Land Imager (OLI) Data in Sumedang Regency). *Jurnal Teknotan. 10*(2): 1978-1067. https://doi.org/10.24198/jt.vol10n2.9

Saswita, A. (2023). Analisis Perubahan Penggunaan Lahan Sawah Kecamatan Nan Sabaris Tahun 2001 dan 2020. *Jurnal Pendidikan Tambusai. 7*(3): 23343–23349.

Sinaga, S. H., Suprayogi, A., & Haniah, H. (2018). Analisis Ketersediaan Ruang Terbuka Hijau dengan Metode Normalized Difference Vegetation Index dan Soil Adjusted Vegetation Index Menggunakan Citra Satelit Sentinel-2A (Studi Kasus: Kabupaten Demak). *Jurnal Geodesi Undip. 7*(1): 202–211.

Susanto, H., & Hidayat, S. (2016). Ekstraksi Informasi Penutup Lahan Area Luas dengan Metode Expert Knowledge Object-Based Image Analysis (OBIA) pada Citra Landsat 8 Oli Pulau Kalimantan. *Majalah Ilmiah Globe. 18*(1): 9-20. https://doi.org/10.24895/MIG.2016.18-1.390

Tatisina, N. N., Siahaya, W. A., & Haumahu, J. P. (2020). Transformasi Indeks Vegetasi Citra Landsat 8 Oli untuk Pemetaan Musim Tanam pada Lahan Sawah di Kabupaten Buru, Provinsi Maluku. *Jurnal Budidaya Pertanian. 16*(2): 197-205. https://doi.org/10.30598/jbdp.2020.16.2.197

Wulansari, H. (2017). Uji Akurasi Klasifikasi Penggunaan Lahan dengan Menggunakan Metode Defuzzifikasi Kemungkinan Maksimum Berbasis Citra Alos Avnir-2. *Bhumi: Jurnal Agraria dan Pertanahan. 3(*1): 98-110. https://doi.org/10.31292/jb.v3i1.233

Zulfikar, M. E. (2021). Perbandingan Metode Klasifikasi Maximum Likelihood dan Minimum Distance pada Pemetaan Tutupan Lahan di Kabupaten Bandung Barat, Jawa Barat. FSTP. (531).-541.