

## **A Comparative Study of Discrepancies in Horticultural Land Use in Muara Wis Subdistrict, East Kalimantan**

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### **Abstrak**

Penelitian ini memiliki tujuan untuk meneliti ketidaksesuaian penggunaan lahan hortikultura dengan Rencana Tata Ruang Wilayah (RTRW) yang berlaku di Kecamatan Muara Wis, Kabupaten Kutai Kartanegara, Kalimantan Timur. Ketidaksesuaian penggunaan lahan terjadi ketika lahan hortikultura beralih fungsi menjadi area tambang, yang dapat berdampak negatif terhadap lingkungan dan ekonomi sosial. Metode yang digunakan dalam penelitian ini adalah deskriptif komparatif dengan pendekatan berbasis ruang. Data yang digunakan mencakup peta RTRW Kabupaten Kutai Kartanegara untuk periode 2023 hingga 2042, citra satelit dari Google My Maps, serta data administratif wilayah dalam format shapefile. Analisis dilakukan dengan cara menggabungkan peta RTRW dan citra satelit untuk menemukan area yang mengalami perubahan dalam penggunaan lahan. Hasil dari penelitian menunjukkan bahwa terdapat beberapa wilayah hortikultura, terutama perkebunan kelapa sawit, yang telah beralih menjadi kawasan pertambangan. Perubahan ini menunjukkan adanya ketidaksesuaian antara rencana tata ruang dan kondisi nyata di lapangan. Alih fungsi lahan ini berpotensi mengakibatkan penurunan kualitas lingkungan, seperti kerusakan tanah, erosi, serta penurunan kualitas air, dan juga berpengaruh terhadap kondisi sosial ekonomi masyarakat yang bergantung pada sektor perkebunan. Oleh karena itu, sangat penting untuk melakukan pengawasan atas penggunaan ruang, pengendalian kegiatan pertambangan, serta rehabilitasi lahan guna menjaga keberlanjutan lingkungan dan kesesuaian tata ruang.

Kata kunci: Penggunaan lahan, Hortikultura, RTRW

### *Abstract*

*This study aims to analyze the inconsistency of horticultural land use with the Regional Spatial Plan (RTRW) in Muara Wis District, Kutai Kartanegara Regency, East Kalimantan. Land use inconsistency occurs due to the conversion of horticultural land into mining areas, which potentially causes environmental and socio-economic impacts. This research used a descriptive comparative method with a spatial approach. The data used consisted of the 2023–2042 RTRW map of Kutai Kartanegara Regency, Google My Maps satellite imagery, and administrative boundary data in shapefile format. The analysis was conducted through an overlay process between the RTRW map and satellite imagery to identify areas experiencing land use changes. The results showed that several horticultural areas, especially oil palm plantations, had been converted into mining areas. These changes indicate an inconsistency between the spatial planning and the actual land use conditions in the field. The land conversion potentially causes environmental degradation such as soil damage, erosion, and decreased water quality, as well as affecting the socio-economic conditions of communities dependent on plantation activities. Therefore, stricter spatial control, mining activity regulation, and land rehabilitation efforts are needed to maintain environmental sustainability and spatial suitability.*

*Keywords: Landuse, Horticulture, Spatial planning*

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## INTRODUCTION

The RTRW plays a crucial role in spatial planning because it serves as a guide for regulating land use to ensure it aligns with established objectives (Missi, 2024). With the RTRW in place, the government is able to manage residential, agricultural, horticultural, and industrial areas, as well as conservation zones, so that regional development can proceed effectively and sustainably (Kurniawan, 2026). The existence of the RTRW also aims to prevent deviations in land use that could lead to environmental damage or conflicts over land use (Aron & Arin, 2022).

However, in practice, land-use changes frequently occur as a result of ongoing human activities (Rezki & Aso, 2020). Growing economic demand and the exploitation of natural resources have led to land conversion in many areas, including the shift from agricultural land to mining sites. This change in land use reflects a mismatch between spatial planning and the actual situation on the ground (Alih et al., 2024).

The conversion of agricultural or horticultural areas into mining sites can have a number of adverse effects on the environment and the sustainability of the agricultural sector. Mining activities risk reducing the area of fertile land, damaging soil structure, increasing erosion rates, and degrading water quality due to sedimentation and mining waste (Ade et al., 2023). Furthermore, land-use conversion can also affect the sustainability of agricultural production and diminish the role of horticultural areas in supporting community food security (fatmawati Budiman Dyasari, 2018).

Muara Wis Subdistrict is one of the subdistricts located in Kutai Kartanegara Regency, East Kalimantan Province. Geographically, this area is part of a lowland region and is heavily influenced by the Mahakam River and several lakes, such as Lake Melintang and Lake Semayang (Kedhaton, 2023). These geographical conditions mean that several areas in Muara Wis consist of swampy land, water bodies, and areas prone to seasonal flooding. In addition to serving as water transport routes, the rivers and lakes are also the main sources of livelihood for the residents, particularly in the fisheries and agriculture sectors (Kartanegara, 2022).

Land use in Muara Wis Subdistrict is highly varied, encompassing water bodies, agricultural land, gardens, production forest areas, residential areas, and open land. Agricultural activities in this area are dominated by food crops and horticultural crops managed by the community using traditional methods (Darma et al., 2023). Some of the commonly cultivated crops include rice, vegetables, and various horticultural plants and

local fruits used for daily needs or sold as a source of income for residents. The soil, influenced by the watershed and water availability, makes several areas in Muara Wis quite suitable for agricultural and horticultural activities (Pitaloka, 2020).

Based on the results of satellite image analysis and spatial evaluation, an area was identified that is designated as a horticultural zone in the Regional Spatial Plan (RTRW) but has, in reality, been transformed into a mining zone. This situation indicates a discrepancy between spatial planning and actual land use on the ground (Haryadi et al., 2023). Changes in land use in Muara Wis Subdistrict are critical because horticultural areas play a vital role in supporting residents' agricultural activities and maintaining the sustainability of the local ecosystem. The conversion of horticultural areas into mining land can lead to the loss of productive land, a decline in soil quality, and changes in the surrounding environment. Therefore, a spatial analysis is needed to identify the types of discrepancies in land use that have occurred and to assess the alignment between the Regional Spatial Plan and the actual conditions in Muara Wis Subdistrict.

## METHOD

This study employs a descriptive-comparative method with a spatial-based approach. The descriptive method aims to describe the state of land use in the study area, while the comparative method serves to analyze the comparison of land use between the RTRW map and the actual conditions observed through satellite imagery (Khan et al., 2025). The spatial-based approach is utilized to detect discrepancies in land use between the spatial plan and the reality on the ground.

This study was conducted in the Muara Wis subdistrict. All data used in the research are secondary data. These secondary data include the 2023–2042 RTRW map of Kutai Kartanegara Regency (ATR/BPN, 2022), satellite imagery obtained via Google My Maps, and administrative data from the Muara Wis subdistrict in SHP format. The RTRW map serves to clarify spatial use patterns and land-use designations in accordance with existing spatial plans, while satellite imagery is used to observe the actual state of land use at the study site (Rochman & Muryamto, 2023).

The analysis process involved comparing the spatial patterns shown on the RTRW map with the actual land use conditions visible in satellite imagery. Subsequently, areas exhibiting discrepancies were identified, particularly in horticultural zones that had been converted into mining areas. The results of this analysis were then described in detail to provide an overview of the land-use changes and the discrepancies found at the study site.

## RESULT AND DISCUSSION

Based on the results of a spatial analysis comparing the RTRW map and Google My Maps satellite imagery, discrepancies in land use were identified in Muara Wis Subdistrict. On the RTRW map, the area is designated as a horticultural zone. Horticultural land refers to areas used for the cultivation of various horticultural crops, including fruits, vegetables, herbs, and plantation crops that hold economic value for the community. In Muara Wis Subdistrict, the horticultural area referred to in this study is dominated by oil palm plantations used by the community and companies as a source of income. However, spatial analysis reveals that a portion of this horticultural land has been converted into mining sites. This land-use change indicates a mismatch between the Regional Spatial Plan (RTRW) and actual on-the-ground conditions, and may have negative impacts on the environment and the sustainability of the plantation sector in the region.

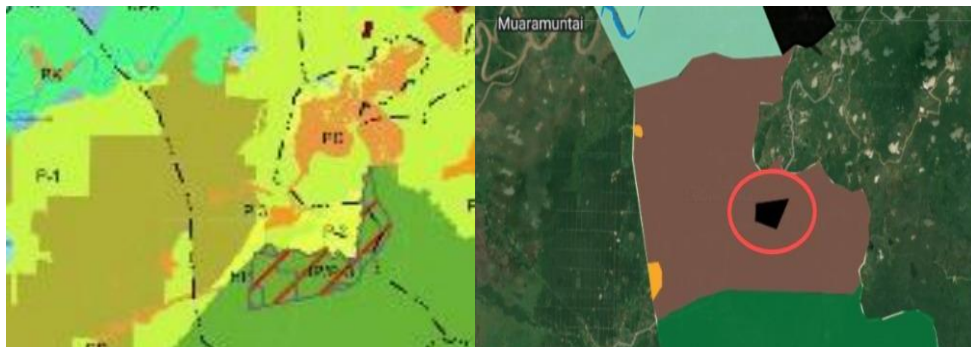


Image 1. Comparison Between the Regional Planning Map and Satellite Imagery

The areas of discrepancy are indicated by the red circles in the figure. A comparison of the two maps reveals a significant shift in land use from the horticulture sector to the mining sector. This situation indicates that land use in some areas is not yet in line with the spatial plans established by the local government. Furthermore, this shift in land use risks having a negative impact on environmental conditions and the sustainability of agricultural activities in the Muara Wis subdistrict.

The findings of the study reveal discrepancies between the Regional Spatial Plan (RTRW) and actual land use in Muara Wis Subdistrict. The results of overlaying the RTRW map with satellite imagery show that some areas designated for horticultural use primarily for oil palm plantations have been converted into mining sites. This change indicates that spatial planning implementation on the ground has not fully aligned with the established plans.

The conversion of land used for oil palm plantations into mining sites is believed to be driven by the higher economic value of the mining sector compared to the plantation sector. Mining activities are seen as offering faster returns, thereby triggering changes in land use. This situation has led to a reduction in the area of productive land previously used by communities and companies for oil palm plantation activities.

These changes in land use can have an impact on the ecosystem. Mining activities can damage soil structure, strip away fertile topsoil, increase erosion, and degrade water quality due to waste from mining operations. These impacts are particularly critical because Muara Wis Subdistrict is an area influenced by the Mahakam River and surrounding lakes, meaning the environmental conditions are highly dependent on the quality of water resources in the area.

In addition to affecting the environment, the shift in land use from oil palm plantations to mining areas also impacts the socioeconomic conditions of the community. The reduction in plantation land area can lower productivity in that sector and reduce job opportunities for people who depend on agriculture and plantations. Over the long term, this situation could shift the community's livelihood from the agricultural sector to the extractive sector.

Given this situation, it is important to strengthen oversight of land use to ensure that land utilization complies with the Regional Spatial Plan (RTRW). Enforcement of regulations governing mining activities particularly in horticultural areas and oil palm plantations must be strengthened through permit monitoring and the crackdown on illegal mining. Efforts to rehabilitate mined land must also be undertaken through reclamation and revegetation processes to restore soil quality and the environment. On the other hand, the community needs to be encouraged to develop more sustainable economic sectors such as agriculture, plantations, and fisheries to reduce dependence on the mining sector. With effective spatial management and collaboration between the government, companies, and the community, the balance between economic activities and environmental sustainability in Muara Wis Subdistrict can be well maintained.

## **CONCLUSION**

Based on a spatial analysis comparing the Regional Spatial Plan (RTRW) map and satellite imagery in Muara Wis Subdistrict, differences in land use were identified, particularly regarding the conversion of horticultural land specifically oil palm plantations

into mining areas. These changes indicate that land use in some areas is not in line with the established spatial plan.

The conversion of land from oil palm plantations to mining areas has the potential to negatively impact the environment and the socioeconomic conditions of local communities, such as a reduction in productive land, soil degradation, declining water quality, and changes in community livelihoods. Therefore, stricter oversight of land use, regulation of mining activities, and land rehabilitation efforts are necessary to ensure that environmental sustainability and spatial harmony in Muara Wis Subdistrict are maintained.

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