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Mapping of the Potential of Tanjung Senang Village Based on Geographic Information System

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Abstract:*Tanjung Senang Village has various physical, social, and economic potentials that have not been documented spatially in the form of an integrated map. This community service activity aims to record and map the potential of the Tanjung Senang Village area visually and simply as supporting material for village development planning. The methods used include field surveys, interviews with neighborhood heads, and spatial data processing using ArcGIS, QGIS, Avenza Maps, and Google Earth software. The results of the activity are a village potential map that displays the administrative boundaries of the village covering an area of 320 hectares, neighborhood unit boundaries in two neighborhoods, road networks, rivers and irrigation channels, public and social facilities, educational and worship facilities, residential areas, and land cover and vegetation. In addition, 44 micro, small, and medium enterprises (MSMEs) were identified as local economic potential. The resulting potential map is expected to be a source of spatial information for the village government and the community in supporting data-based regional development planning.*

Introduction

Regional development planning at the sub-district level requires accurate, integrated and easily accessible data (Zaidir & Listiawan, 2020). One very important form of data is spatial data presented in the form of thematic maps (Meidodga et al., 2023). A regional potential map can describe the physical, social, and economic conditions of a region so that it can be the basis for decision-making and sustainable development planning (Nasution et al., 2025).

At the sub-district level, the availability of spatial data is often still limited and has not been systematically documented (Sela et al., 2025). Information regarding administrative boundaries, infrastructure networks, public facilities, educational facilities, visualized residential areas, and land

cover is often distributed in textual data form and not geospatially. This condition results in regional development planning not being fully data-based and tending to be administrative in nature (Idrus et al., 2025).

Tanjung Senang Village is an area with diverse potential, including physical, social, and economic development. This potential includes government facilities, educational facilities, healthcare facilities, road networks, agricultural land, residential areas, and community MSME activities. However, information on this potential is not yet available in an integrated map that is easily understood by the village government and the community.

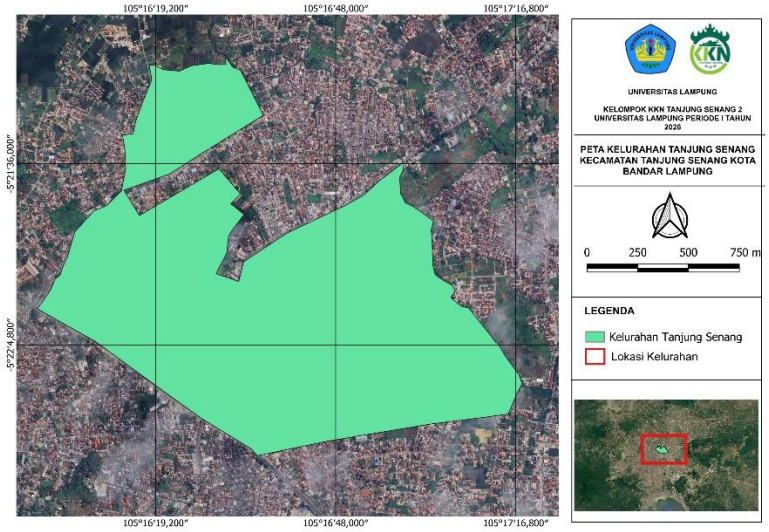

Figure 1. Location Map of Tanjung Senang Subdistrict

The 2026 student Community Service Program (KKN) in Tanjung Senang Village is aimed at supporting regional data management through the development of a geographic information system (GIS)-based village potential map. This potential map is expected to serve as a spatial information tool to support regional development planning, resource management, and the development of local economic potential.

The objectives of this community service activity are (1) to record the potential of the Tanjung Senang sub-district area, (2) to present information on the sub-district's potential in the form of a visual and simple thematic map, and (3) to provide supporting materials for the sub-district government and the community in planning future development activities.

Method

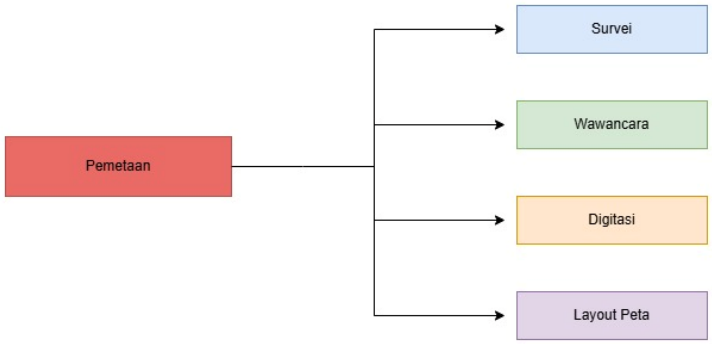

Figure 2. Flowchart of the stages of mapping the potential of Tanjung Senang Village

The Tanjung Senang Village potential mapping activity was carried out in 2026 through several stages. The first stage involved the preparation and collection of secondary data in the form of a base map, satellite imagery, and village administrative data. The second stage involved a field survey to

identify the physical condition of the area, including road networks, rivers, public facilities, educational facilities, places of worship, residential areas, and land cover.

The third stage is an interview with the neighborhood head to obtain information about the RT boundaries, regional potential, and facilities in each neighborhood. The fourth stage is spatial data processing using ArcGIS, QGIS, Avenza Maps, and Google Earth software. The data processing process includes digitizing the administrative boundaries of sub-districts, RT boundaries per neighborhood, road networks, rivers and irrigation channels, public and social facilities, educational and worship facilities, residential areas, as well as land cover and vegetation.

The final stage is the preparation of a layout for the village potential map, which includes map elements such as a legend, scale, north orientation, and geographic coordinate system. The resulting potential map is then descriptively validated through discussions with village officials to ensure it aligns with field conditions.

Results and Discussion

Figure 3. Documentation of field survey activities and interviews with village officials

General Conditions of the Tanjung Senang Subdistrict Area

Tanjung Senang Village covers an area of approximately 320 hectares (3.2 km²), divided into two neighborhoods. Neighborhood 1 consists of 22 neighborhood units (RT), while Neighborhood 2 consists of 8 neighborhood units (RT). Generally, the neighborhood is dominated by residential areas, rice fields, and other vegetation. The road network and irrigation channels provide essential infrastructure supporting community activities, particularly in the agricultural and residential sectors.

Potential Map of Tanjung Senang Village

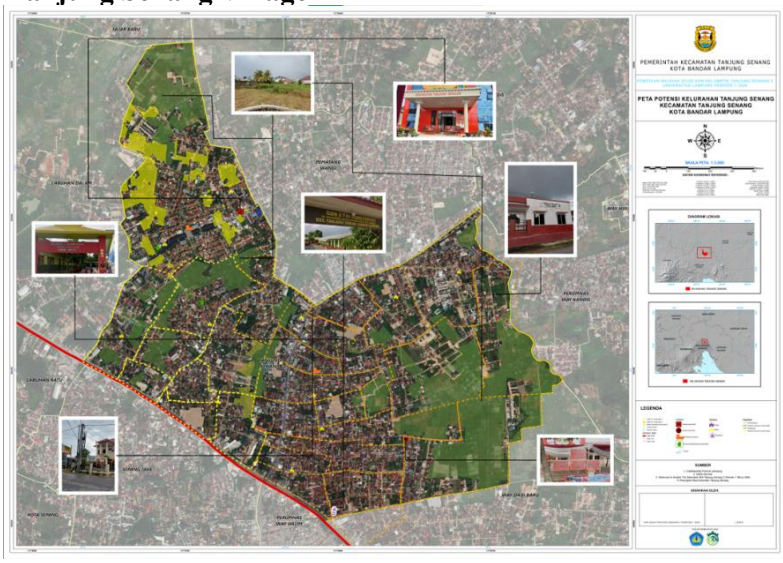

Figure 2. Potential Map of Tanjung Senang Village

The Tanjung Senang Urban Village potential map shows the spatial distribution of various regional elements, including administrative boundaries, neighborhood unit boundaries, road networks, rivers and irrigation channels, public and social facilities, educational and religious facilities, residential areas, and land cover and vegetation. This map provides a comprehensive and integrated overview of the urban village's spatial condition.

Distribution of Public and Social Facilities

Public and social facilities identified in the mapping include the village office, sub-district office, police station, and sub-district health center. The presence of these facilities demonstrates Tanjung Senang Village's role as a center for government and health services for the local community. The relatively centralized distribution of facilities facilitates public access to public services (Datamora & Malau, 2019).

Educational and Worship Facilities

The mapped educational facilities include Tanjung Senang 1 Public Elementary School and Tanjung Senang 2 Public Elementary School. Places of worship were also identified as part of the social infrastructure that supports community religious activities. The even distribution of educational and worship facilities across the sub-district demonstrates support for the community's social and cultural aspects.

Residential Areas and Land Cover

Residential areas are the dominant land cover in Tanjung Senang Village, followed by rice fields and other vegetation. Settlement patterns tend to follow the road network and main infrastructure (Yenny et al., 2025). The presence of rice fields indicates the agricultural sector's still quite significant potential, while other vegetation acts as an environmental buffer.

Local Economic Potential (MSMEs)

The data collection results show that there are 44 micro, small, and medium enterprises (MSMEs) spread across the sub-district. While not all MSMEs are shown on the map due to their large number, this data demonstrates the potential of the local economy that can be further developed. MSMEs play a role in improving the community's economy and can serve as a basis for developing the creative economy and local entrepreneurship (Ramadani et al., 2025).

Implications of Potential Maps for Regional Planning

The Tanjung Senang Urban Village potential map can be used as a basis for spatial data-based regional development planning. Information on the distribution of public facilities, infrastructure networks, residential areas, and land cover can support the development of infrastructure development programs, spatial planning, agricultural sector development, and strengthening the local economy through MSMEs (Judijanto et al., 2026). In addition, potential maps can also be used as an information medium for the community and stakeholders to visually understand regional conditions.

Conclusion

The Tanjung Senang Village potential mapping activity successfully produced a spatial thematic map that maps the village's administrative boundaries covering 320 hectares, the division of 30 neighborhood units (RT) into two neighborhoods, road networks, rivers and irrigation channels, public and social facilities, educational and worship facilities, residential areas, and land cover and vegetation. In addition, 44 MSME units were identified as potential local economic entities. These findings indicate that the area is dominated by residential areas with rice fields that still support agricultural activities, and that the distribution of public facilities is relatively centralized, facilitating access to services. The potential map provides an integrated picture that can be used as a basis for spatial planning, infrastructure development, mapping public service priorities, and planning for local economic empowerment based on MSME locations.

The study has limitations in temporal coverage and attribute detail; the field data is a snapshot of 2026, thus not capturing the dynamics of long-term land use changes and economic activities, and some

MSMEs are not all mapped in detail due to the limited number and resources. For further research, it is recommended that the data be updated periodically, the use of higher-resolution satellite imagery or participatory surveys to enrich MSME attributes and socioeconomic aspects, and the data be integrated with the village information system to create a dynamic database. In practice, this potential map can be directly used by the village government and the community to plan infrastructure programs, spatial planning, agricultural development, and MSME strengthening strategies, as well as serve as a public communication tool that facilitates spatial data-based decision-making.

Thank-you note

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