2025 ANNUAL INTERNATIONAL INTERDISCIPLINARY CONFERENCE AND RESEARCH EXPO (AIICARE)
Vol.2, No.1, 2025: December: 123-132

Managing Regional Potential Based on Geographic Information System in Candirejo Village, Tuntang District, Semarang Regency

Saipullah Hasan

Program Studi PMI, Fakultas Dakwah, UIN Salatiga, Indonesia
saifulhasan@uinsalatiga.ac.id

Submission Track:
Received: 01-10-2025, Final Revision: 27-12-2025, Available Online: 30-12-2025
Copyright © 2025 Authors

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

ABSTRACT
Candirejo Village, located in Tuntang District, Semarang Regency, Central Java Province, faces the problem of unorganized village archive management and the absence of a village potential map. This can result in village development planning not prioritizing the development of natural resource potential. The application of a geographic information system (GIS) can create digital documents that provide an overview of the administrative area and its regional potential. The community service method utilizes asset-based community development (ABCD), involving the active participation of village officials in data collection in the field, from data collection to data validation. The result is that village potential data is presented visually so that it can attract the attention of the village government to organize and re-manage its natural resource potential. The community service activities aim to (1) build a GIS-based village information system, (2) create a digital village map document as a reference in designing development plans.

Keywords: *managing, regional potential, geographic information systems.*

2025 ANNUAL INTERNATIONAL INTERDISCIPLINARY CONFERENCE AND RESEARCH EXPO (AIICARE)
Vol.2, No.1, 2025: December: 123-132

ABSTRAK
Desa Candirejo, yang terletak di Kecamatan Tuntang, Kabupaten Semarang, Provinsi Jawa Tengah menghadapi masalah belum tertatanya manajemen arsip desa dan belum adanya peta potensi desa. Hal ini bisa berakibat pada perencanaan pembangunan desa kurang memprioritaskan pengembangan potensi sumber daya alam. Aplikasi sistem informasi geografis (SIG) dapat membuat dokumen digital yang berisi gambaran wilayah administrasi dan potensi wilayah. Metode pengabdian menggunakan asset based community development (ABCD) dengan melibatkan peran aktif para perangkat desa dalam pengambilan data di lapangan hingga tahap validasi data. Hasilnya data potensi desa disajikan secara visual sehingga dapat menarik perhatian pemerintah desa untuk menata dan mengelola kembali potensi sumber daya alam yang dimiliki. Kegiatan pengabdian bertujuan untuk (1) membangun sistem informasi desa berbasis SIG (2) membuat dokumen peta desa digital sebagai salah satu referensi dalam merancang perencanaan pembangunan.

Kata kunci: mengelola, potensi wilayah, sistem informasi geografis

INTRODUCTION

In Indonesia, poverty generally occurs in rural areas. This condition is quite ironic, as rural areas have abundant natural resources, but they are not being optimally utilized (Ariadi, 2019, p. 136). Digital villages are essential as an effective solution to increase community participation and improve the quality of life, thereby enhancing the application of information and communication technology in village life (Giyanto et al., 2023). Village data and information can be presented visually in the form of maps and packaged in a geospatial-based village information system, also known as GIS (Ismail et al., 2021, p. 63).

Digital villages in Indonesia face challenges due to poor data quality, a lack of knowledge, and inadequate technology integration, which hinders the delivery of public services and maximizes their potential (Darmawan et al., 2024, p. 79). Another problem in

realizing digital services is the lack of knowledge and preparation regarding the implementation of the digital village media program system (Gufran et al., 2023, p. 551).

Villages that can independently utilize information technology for development management will be able to mobilize various potential and resource assets, improve the basic needs of citizens, address livelihood needs, advocate for citizens' rights, and organize their lives sustainably (Gufran et al., 2023, p. 551). Development planning and potential development can be carried out by the government using a bottom-up planning mechanism (Bottom-Up Planning), so that the community plans its own future (Ariadi, 2019, p. 136).

Based on the needs analysis in Candirejo Village, several main problems were found, namely (1) the management of village archives was not yet organized, (2) there was no village potential map, (3). These problems can hinder access to information for the community and village decision-making regarding the prioritization of potential development. To overcome these problems, the proposed solutions offered in this community service activity are (1) building a GIS-based Village Information System, (2) creating a digital map of the village's potential.

RESEARCH METHOD

The community service team uses Asset-Based Community Development (ABCD) as a method of community service. This approach focuses on the assets or potential possessed by the community, which can be further developed and empowered by the wider community (Riyanti & Raharjo, 2021). The ABCD approach assumes that the community itself is the primary entity capable of solving societal problems, and all improvement efforts begin with enhancing social capital (Mallapiang et al., 2020). This approach is based on the strengths and potential inherent in society itself (Kristanto & Putri, 2021).

The process of discovering the village's potential uses an Android-based geographic information system application. This is because application development in the internet environment has shown great potential in relation to geographic information (Ismail et al.,

2021, p. 63). Geographic Information Systems are systems designed to work with spatially referenced data or geographic coordinates (Hamdi et al., 2018, pp. 78–86).

A Geographic Information System (GIS) is a system designed for the collection, storage, analysis, and graphical visualization of spatial (geographic) data along with relevant information about essential objects(Talipova et al., 2023, p. 1831). Geographic information system applications can be used in various sectors to facilitate human activities and meet needs. For example, printing maps and providing documents that serve as the basis for village development planning (Rizky & Subiyakto, 2022). GIS can help local governments and communities identify and analyze potential findings based on their location within their area (Ramadhan & Arfiani, 2024, p. 419).

Related to the data collection process are (1) Plotting using Afenza Map. The team conducted plotting using the Afenza Maps application when collecting data in the field, accompanied by the hamlet heads (2), and a Focus Group Discussion (FGD) using Raster. The team determined village boundaries, hamlet boundaries, and RT boundaries in collaboration with village officials, using raster/satellite image maps (3). The results of this mapping have been confirmed with village officials to ensure the validity of the data.

.

DISCUSSION

Various potentials in the Candirejo Village area are not only created manually but can also be presented in digital map form (Farida & Rosalina, 2022, p. 75. To manage its potential and territory, it is necessary to understand the main elements of a village, namely: 1) territory consisting of location and boundaries, 2) population, and 3) religious norms and customs (Sakir et al., 2023, p. 1821).

Community service activities have yielded outputs in the form of regional potential documents presented in map format, providing a visual representation of the region and its potential. Below are several maps showing the area and its potential in Candirejo Village.

Geographical Location

Candirejo Village is located in the Tuntang District, Semarang Regency, Central Java Province. Geographically, Candirejo Village is situated at 110.43862, -7.31110 North Latitude and 110.47311, -7.29523 South Latitude in the central part of Java Island, specifically in the Central Java region. Tuntang District is one of 19 districts in Semarang Regency. Tuntang District directly borders the Rawa Pening area to the west and is bordered by Salatiga Regency to the east. Tuntang District has an area of 5,624 hectares, comprising rice fields, dry fields, settlements, and other sectors.

Candirejo Village is one of 16 villages in the Tuntang District. Based on the 2022 census, Candirejo Village covers an area of 438.94 hectares. It borders several villages and towns. To the north, it borders Kesongo Village; to the east, it borders Blotongan Village and Pulutan Village; to the south, it borders Jombor Village; and to the west, it borders Rawa Pening.

On the map below, Candirejo Village is symbolized in pink, and other villages in the Tuntang District area are symbolized in cream.

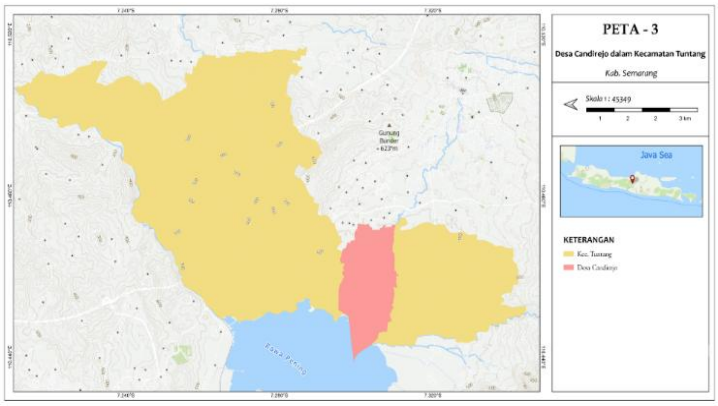


Figure 2. Candirejo Village in Tuntang District
(Source: Delineation and results of participatory FGDs, 2023)

Candirejo Village is located in the western and southern parts of Tuntang District. A black dot visualizes it. The blue line indicates the Tuntang District area, and the red line indicates the Semarang Regency area.

Potential of Rawa Pening

Orbital distance mapping is necessary to evaluate the relationship between an area and its nearest vital objects, considering whether they have negative or beneficial impacts. In a straight line, Candirejo Village is 0–1 km from the Rawa Pening boundary. Meanwhile, when measured from the center of Rawa Pening, Candirejo Village is 0–3.4 km away. The cream-colored area represents Tuntang District, while the pink area represents Candirejo Village. Rawa Pening is visualized in blue.

Candirejo Village directly borders Rawa Pening. Distance-wise, Candirejo Village is within 2-4 km of Rawa Pening. This means the village has the potential to become a tourist destination within Rawa Pening. However, the town is also impacted by the national development project to expand Rawa Pening.

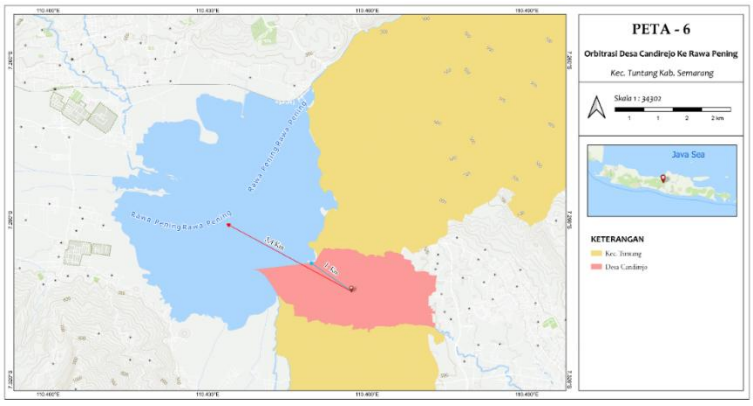


Figure 5. The Orbit of Candirejo Village to Rawa Pening
(Source: Delineation and results of participatory FGDs, 2023)

2025 ANNUAL INTERNATIONAL INTERDISCIPLINARY CONFERENCE AND RESEARCH EXPO (AIICARE)
Vol.2, No.1, 2025: December: 123-132

Land Use Potential

The cream-colored area indicates a residential area. The green area to the west of Candirejo Village indicates the border. The border is a rice field area submerged by water from Rawa Pening. During the dry season, the border can be used for farming, but during the rainy season, it is not suitable for agriculture. The water from Rawa Pening overflows into the area.

Areas in light green indicate lowlands containing rice paddy vegetation. Areas in pink indicate open areas, which lack ample vegetation. Areas in dark green indicate dryland areas. Dryland areas tend to be located in higher elevations with large areas of plant vegetation.

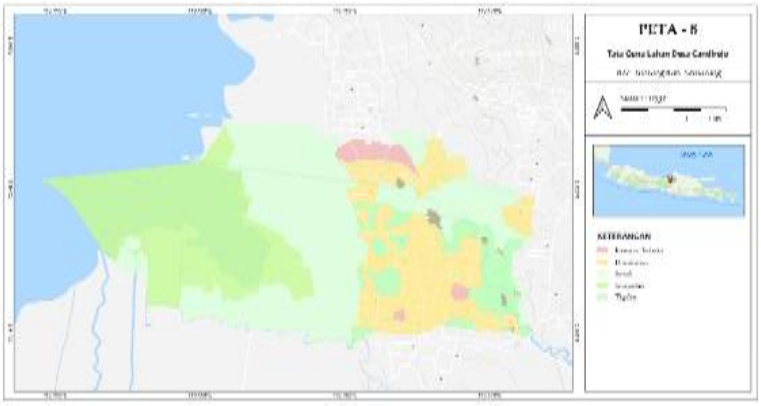


Figure 7. Land use in Candirejo Village

(Source: Delineation and results of participatory focus group discussions, 2023)

CONCLUSION

The Candirejo Village Government now has a document containing regional data and an assessment of natural resource potential. This data is presented in a more engaging digital map, attracting the attention of both the government and the local community. The digital map of village potential will help the village government identify and manage village potential more accurately.

The community's dedication and mentoring efforts have demonstrated the active participation of village officials in learning together to understand their region visually through the digital map. The availability of visual data makes it easier for the community to recognize and understand various potential areas, which actually offer numerous development opportunities. Thus, rural communities will be able to map potential based on their own knowledge. This will strengthen their knowledge and control over their territory.

ACKNOWLEDGMENTS

The researcher would like to gratefully acknowledge the Rector of UIN Salatiga for their support and grant given in finishing this research.

REFERENCES

Ariadi, A. (2019). Perencanaan Pembangunan Desa. *Meraja Journal*. 2(2). 135-147

Darmawan, K. A., Daryanto, E., Muqaddas, Z., Kartini, Anekawati, A., Akramul Umam, B., & Muhsi. (2024). Empowerment of Village Officials in Realizing a Digital Village Through Assistance with a GIS-Based Digital Village Information System in Buddagan Village, Pamekasan Regency. *International Journal of Engagement and Empowerment*, *4(1)*(1), 79–82. https://doi.org/10.53067/ije2.v4i1

Farida, O. A., & Rosalina, F. (2022). Pelatihan Dasar Sistem Informasi Geografis Menggunakan Software Mapinfo. *JPM Jurnal Pengabdian Mandiri*, *1(2)*(1), 75–82. http://bajangjournal.com/index.php/JPM

Giyanto, B., Murtinah, S. T., & Hamka. (2023). Collaborative Governance in the Development of Digital Villages in Karanganyar Indonesia. *KnE Social Sciences*, 337–361. https://doi.org/10.18502/kss.v8i11.13557

Gufran, Ma'arij, A., & Hajairin. (2023). Village Government Legal Policies in Information Technology-Based Public Services. In *Awang Long Law Review* 5(2).

Hamdi, Usman, & Samsudin. (2018). Perancangan Sistem Informasi Geografis Pemetaan Taman di Kabupaten Indragiri Hilir Berbasis Web. In *Jurnal SISTEMASI* 7 (2). 87-94

Ismail, A., Alwi Firdaus Irwan, M., Syamsir, M., Habibie Syahid, M. B., & Faiq Qushasyi, M. (2021). *Sistem Informasi Geografis (SIG) Lokasi UMKM Berbasis Android Guna Meningkatkan Perekonomian UMKM*. 2(2). 62-75

Kristanto, T. B. A., & Putri, A. A. (2021). Pengembangan Masyarakat Berbasis Aset Sebagai Upaya Pemberdayaan Masyarakat melalui Sektor Wisata Kebugaran di Indonesia. *Journal of Social Development Studies*, *2*(2), 43–54. https://doi.org/https://doi.org/10.22146/jsds.2272

Mallapiang, F., Kurniati, Y., Syahrir, S., Lagu, Abd. M. H., & Sadarang, R. A. I. (2020). Pengelolaan sampah dengan pendekatan Asset-Based Community Development (ABCD) di wilayah pesisir Bulukumba Sulawesi Selatan. *Riau Journal of Empowerment*, *3*(2), 79–86. https://doi.org/10.31258/raje.3.2.79-86

Maulana, M. (2019). Asset-Based Community Development: Strategi Pengembangan Masyarakat. *Empower: Jurnal Pengembangan Masyarakat Islam*, *4*(2) https://doi.org/10.24235/empower.v4i2.4572

Ramadhan, I., & Arfiani, I. (2024). Development of Geographic Information Systems in Mapping Village-Owned Enterprises in Sleman Regency. *IJID (International Journal on Informatics for Development)*, *13(1)*, 418–433. https://doi.org/10.14421/ijid.2024.4513

Riyanti, C., & Raharjo, S. T. (2021). Asset Based Community Development Dalam Program Corporate Social Responsibility (CSR). *Jurnal Kolaborasi Resolusi Konflik*, *3*(1), 112-126 https://doi.org/10.24198/jkrk.v3i1.32144

Rizky, M., & Subiyakto, A. (2022). Pemanfaatan Artificial Intelligence dalam Menghadapi Pademi Covid-19: Systematic Literatur Riview. In *Jurnal Sistem Cerds,* 5(1), 46-52.

Sakir, S., Mutiarin, D., & Afisa, A. (2023). Digitalisasi Kalurahan: Pendampingan Optimalisasi Website dan Media Sosial Sebagai Layanan Berbasis Digital di Kalurahan Sendangarum Minggir Sleman. *Abdi: Jurnal Pengabdian Dan Pemberdayaan Masyarakat*, *5*(2), 271–277. https://doi.org/10.24036/abdi.v5i2.390

Sittadewi, H. E. (2008). *Kondisi Lahan Pasang Surut Kawasan Rawa Pening dan Potensi Pemanfaatannya. Jurnal Teknologi Lingkungan* 9(3)

Talipova, L., Morozova, E., Pestova, D., & Skhvediani, A. (2023). Methodology for Creating a Geographic Information System for Transport Infrastructure Facilities. *International Journal of Technology*, *14(8)*, 1831–1840. https://doi.org/10.14716/ijtech.v14i8.6849