

A GIS APPROACH TO ASSESSING THE ACCESSIBILITY OF ZAKAT, INFAQ, AND ŞADAQAH PROGRAMS OF LAZISMU D.I. YOGYAKARTA

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ABSTRACT

The distribution of zakat, infaq, and *şadaqah* (ZIS) plays an important role in social welfare and poverty alleviation within Islamic social finance. However, previous studies have focused mainly on institutional efficiency, accountability, and transparency, while spatial accessibility and regional inequality in ZIS distribution remain underexplored. This study analyzes the spatial distribution and accessibility of ZIS beneficiaries managed by LAZISMU in the Special Region of Yogyakarta using a Geographic Information System (GIS)-based approach. Employing a descriptive quantitative method and QGIS-based spatial analysis, this study used the 2025 LAZISMU D.I. Yogyakarta beneficiary dataset, which includes addresses, program categories, assistance types, and *aşnâf* classifications. Data processing involved cleaning, geocoding, spatial integration, overlay analysis, spatial aggregation, and choropleth mapping at the subdistrict level. The findings show that ZIS distribution is spatially uneven, with higher beneficiary concentrations in urban and institutionally accessible areas, while several peripheral regions remain underserved. This study contributes to Islamic social finance governance by positioning GIS as an evidence-based instrument for evaluating spatial accessibility, regional inequality, and equitable ZIS distribution planning.

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INTRODUCTION

Zakat is an Islamic social finance instrument with spiritual, social, and economic dimensions. Beyond its function as a religious obligation, zakat also serves as a mechanism for

poverty alleviation, socioeconomic redistribution, and community welfare (Erni et al., 2024; Maisyarah & Hamzah, 2024). Alongside infaq and *şadaqah* (ZIS), zakat operates as a redistributive mechanism that

transfers wealth from economically capable groups to vulnerable communities in pursuit of distributive justice and social solidarity. The imperative of equitable ZIS distribution is affirmed in Qur'an 9:60 (Sūrat al-Tawbah), which identifies the eligible recipient categories, known as *aṣṇāf*:

﴿ إِنَّمَا الصَّدَقَتُ لِلْفُقَرَاءِ وَالْمَسْكِينِ وَالْعَمِلِينَ عَلَيْهَا
وَالْمُؤَلَّفَةِ قُلُوبُهُمْ وَفِي الرِّقَابِ وَالْغَرَمِينَ وَفِي سَبِيلِ اللَّهِ وَأَبْنِ
السَّبِيلِ فَرِيضَةً مِّنَ اللَّهِ وَاللَّهُ عَلِيمٌ حَكِيمٌ

"Zakat expenditures are designated only for the poor, the needy, zakat administrators, those whose hearts are to be reconciled, the freeing of enslaved persons, those burdened by debt, the cause of Allah, and stranded travelers; this is an obligation from Allah. Allah is All-Knowing and All-Wise" (Q.S. At-Taubah: 60).

This verse demonstrates that zakat is not only an act of worship but also an instrument of social welfare distribution aimed at advancing economic justice and public benefit (Suhendar et al., 2022). Accordingly, ZIS funds should be managed and distributed accurately, transparently, and equitably so that assistance reaches communities in need across different regions. Contemporary Islamic social finance research increasingly emphasizes institutional governance, accountability, digital transformation, and the effectiveness of zakat distribution systems. Recent studies have examined institutional transparency, operational efficiency, fintech integration, blockchain implementation, and digital governance as mechanisms for improving Islamic philanthropic services and public trust (Mukti et al., 2022). Other studies have highlighted the contribution of zakat programs to poverty alleviation, economic empowerment, and beneficiary welfare (Faizah

& Haryono, 2025; Sarib et al., 2024). Collectively, this body of literature indicates a shift toward evidence-based management and data-informed decision-making in Islamic social finance governance.

Despite these developments, most studies continue to evaluate ZIS management primarily from financial, administrative, and institutional perspectives, particularly through efficiency measurement, accountability assessment, and impact evaluation (Kamaludin Yusup et al., 2021). Far less attention has been paid to spatial accessibility, regional disparities, and geographical equity in beneficiary distribution, especially at the level of zakat management institutions. Consequently, evidence on underserved areas, unequal distribution coverage, and regional accessibility remains limited. This gap constrains the capacity of zakat institutions to identify priority areas and design regionally balanced distribution strategies. Without spatial analysis, evaluations of ZIS distribution may overlook areas that are institutionally underserved despite their potential need for social assistance.

From the perspective of Islamic social finance governance, equitable ZIS distribution is closely related to spatial justice, namely the principle that welfare support should be accessible across geographical areas. Communities in peripheral or less accessible locations may have lower access to ZIS programs because of operational constraints, transportation barriers, and uneven institutional outreach. Therefore, evaluating ZIS distribution solely through financial indicators is insufficient for assessing whether Islamic social finance programs are distributed equitably and inclusively. A spatial perspective is therefore necessary to examine not only how much assistance is distributed, but also where

it is distributed and which areas remain insufficiently covered.

In this context, Geographic Information Systems (GIS) offer an opportunity to strengthen evidence-based Islamic social finance governance through spatial visualization and regional accessibility analysis. GIS enables the simultaneous integration and analysis of spatial and attribute data, allowing institutions to identify distribution patterns, underserved areas, and regional disparities through thematic mapping and spatial analysis (Daniel & Mbon, 2024; Rita Uchenna Attah et al., 2024).

Previous studies show that GIS is effective for poverty mapping, public-service planning, and humanitarian distribution because it supports geographically informed decision-making. However, research integrating GIS into ZIS distribution governance remains limited, particularly studies that examine spatial inequality, institutional accessibility, and regional distribution coverage within Islamic philanthropic institutions (Efita & Triase, 2024). Moreover, existing GIS-based zakat studies tend to position GIS primarily as a visualization tool rather than as an analytical instrument for evaluating distributive equity and institutional outreach. Based on this gap, the present study analyzes the spatial distribution and accessibility of ZIS beneficiaries managed by LAZISMU in the Special Region of Yogyakarta using a GIS-based approach.

Unlike previous studies that primarily emphasize institutional efficiency and financial effectiveness, this study positions GIS not merely as a mapping tool but as an evidence-based analytical instrument for identifying spatial inequality, evaluating institutional accessibility, and supporting more equitable and inclusive ZIS distribution planning. The

novelty of this study lies in its use of GIS as a spatial governance instrument within Islamic social finance, particularly for assessing regional distribution equity at the institutional level. The study contributes to the development of spatial governance in Islamic social finance by offering a region-based evaluative framework and evidence-based insights for strengthening distributive justice in ZIS management.

LITERATURE REVIEW

Zakat, infaq, and *sadaqah* (ZIS) are key instruments of Islamic social finance. They function not only as religious obligations but also as mechanisms of socioeconomic redistribution that promote social welfare and distributive justice. By redistributing wealth from economically advantaged groups to vulnerable communities, ZIS contributes to poverty alleviation, income redistribution, and the strengthening of social solidarity (Hidayah & Hasan, 2025; Sarib et al., 2024). In contemporary Islamic philanthropy, effective ZIS management is increasingly associated with institutional accountability, equitable distribution, transparency, and evidence-based welfare targeting. Accordingly, the evaluation of ZIS distribution should not be limited to financial and administrative performance; it should also consider whether the distribution system provides equitable and inclusive access for beneficiaries across geographical regions.

Recent studies on zakat and Islamic philanthropy have predominantly examined institutional governance, operational efficiency, transparency, accountability, and digital transformation within zakat management organizations. Quantitative approaches such as descriptive statistics, the Allocation-to-Collection Ratio (ACR),

regression analysis, and Data Envelopment Analysis (DEA) have been widely used to evaluate the effectiveness and efficiency of zakat collection and distribution systems (Asya'bani et al., 2025; Kamaludin Yusup et al., 2021). Technological developments have also encouraged the adoption of fintech, blockchain, artificial intelligence, and digital governance systems to improve transparency, accountability, and service quality in Islamic social finance institutions (Mukti et al., 2022).

These studies show that effective institutional governance contributes to poverty alleviation, institutional sustainability, and community economic empowerment. Although previous studies offer important insights into the institutional and financial dimensions of ZIS management, most rely on nonspatial approaches. Existing research generally focuses on operational performance, financial effectiveness, and socioeconomic impacts, but it rarely examines the geographical distribution of beneficiaries. As a result, spatial accessibility, regional disparities, unequal service coverage, and geographical equity remain insufficiently addressed.

This limitation weakens the ability of Islamic philanthropy institutions to identify underserved areas, evaluate regional imbalances, and formulate evidence-based distribution strategies that are more equitable and inclusive. Within Islamic social finance governance, equitable ZIS distribution is closely associated with spatial justice, which emphasizes balanced access to welfare services and financial assistance across geographical regions. Unequal spatial coverage can create disparities in beneficiary access, particularly for communities in peripheral, rural, or less accessible areas. Thus, financial indicators alone cannot fully determine whether Islamic social finance programs reach vulnerable

populations fairly and effectively. Spatial analysis is therefore needed to explain how institutional accessibility, geographical reach, and regional conditions shape the implementation and coverage of ZIS distribution programs.

Several studies have also examined the socioeconomic effects of ZIS distribution on poverty reduction and community empowerment. Their findings suggest that productive and consumptive zakat programs can improve beneficiary income, living standards, and access to basic services (Faizah & Haryono, 2025; Yuniarti et al., 2023). However, these studies generally evaluate program outcomes through socioeconomic indicators without incorporating spatial accessibility or geographical distribution analysis. Consequently, the relationship between institutional outreach, regional accessibility, and equitable beneficiary distribution remains underdeveloped.

In response to these limitations, GIS has emerged as an important tool for spatial analysis and evidence-based governance. GIS enables the simultaneous integration, management, visualization, and analysis of spatial and attribute data, allowing researchers and policymakers to identify geographical patterns, regional disparities, and accessibility gaps more systematically (Sari et al., 2023). Across different sectors, GIS has been applied in poverty mapping, disaster management, humanitarian logistics, and public-service planning because it supports spatially informed decision-making and thematic visualization (Daniel & Mbon, 2024; Rita Uchenna Attah et al., 2024). Through thematic mapping and spatial analysis, GIS can support more targeted, adaptive, and regionally balanced policy planning.

Nevertheless, studies that integrate GIS into Islamic social finance governance remain limited. Existing GIS-based zakat research generally focuses on beneficiary mapping and spatial visualization, without comprehensively examining regional accessibility, spatial inequality, institutional coverage, and underserved areas within ZIS distribution systems (Efita & Triase, 2024).

Moreover, previous studies often position GIS as a technical mapping tool rather than as an analytical and governance instrument for evaluating equitable distribution and supporting evidence-based decision-making in Islamic philanthropy institutions (Hidayati, 2026). Based on these gaps, this study applies a GIS-based spatial analysis approach to evaluate the distribution and accessibility of ZIS beneficiaries managed by LAZISMU in the Special Region of Yogyakarta. Unlike previous studies that mainly emphasize institutional efficiency and financial effectiveness, this study positions GIS as a governance instrument for Islamic social finance. It focuses on identifying spatial inequality, evaluating regional accessibility, analysing institutional distribution coverage,

and detecting underserved areas through thematic mapping and spatial visualization. Therefore, this study contributes to evidence-based Islamic social finance governance by supporting more equitable beneficiary targeting, regionally balanced distribution planning, and distributive justice in ZIS management.

RESEARCH METHOD

This study employed a descriptive quantitative approach supported by GIS-based spatial analysis to evaluate the spatial distribution, regional accessibility, and beneficiary coverage of ZIS beneficiaries in the Special Region of Yogyakarta. GIS was used not merely for spatial visualization but also as an evidence-based analytical instrument for evaluating spatial inequality, institutional accessibility, and regional distribution equity within Islamic social finance governance. This approach enables the simultaneous integration, management, visualization, and analysis of spatial and attribute data, thereby facilitating a more comprehensive understanding of geographical distribution patterns and underserved areas.

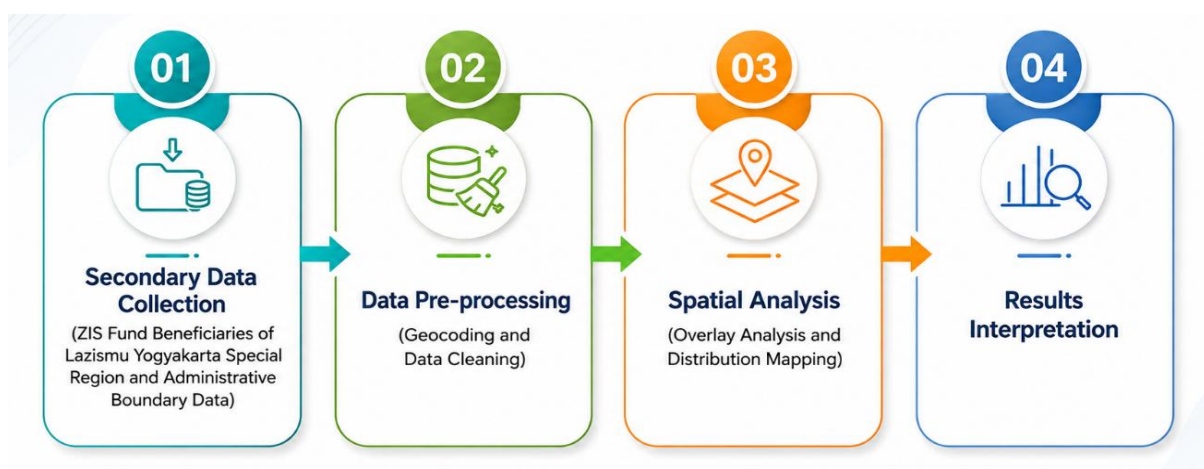


Figure 1. Research Methodology Flowchart.

Source: Authors' elaboration.

Figure 1 presents the methodological framework applied in this study. The process began with the collection of secondary data, consisting of beneficiary data from LAZISMU D.I. Yogyakarta and administrative boundary data for the Special Region of Yogyakarta. The beneficiary dataset then underwent preprocessing, including data cleaning, address standardization, and geocoding to convert textual addresses into geographic coordinates. After coordinate validation, spatial analysis was conducted through overlay analysis, spatial aggregation, and thematic mapping in QGIS. The final stage involved the interpretation of spatial distribution patterns, accessibility, and regional disparities of ZIS beneficiaries.

Data Source and Research Scope

This study used secondary data comprising attribute and spatial data. The attribute data were obtained from the monthly recapitulation reports of LAZISMU D.I. Yogyakarta for the 2025 ZIS distribution period. The dataset included beneficiary activities, program categories, program pillars, types of assistance, aṣnāf classifications, and beneficiary addresses. The dataset consisted of 641 beneficiary records. The beneficiary data were obtained with institutional permission, used solely for academic analysis, and accessed through the official LAZISMU D.I. Yogyakarta website: <https://lazismudiy.or.id/>.

The spatial data consisted of subdistrict-level administrative boundary data for the Special Region of Yogyakarta obtained from the Geoit Administrative Boundary Indonesia database. The subdistrict was selected as the spatial unit of analysis because it provides an appropriate level of regional aggregation for identifying spatial distribution patterns, regional disparities, and institutional coverage

while maintaining interpretability and consistency in comparative thematic mapping (Schiewe, 2024). Subdistrict-level analysis also enables clearer evaluation of regional accessibility and service reach without producing the excessive spatial fragmentation that may occur at smaller administrative scales.

Data Cleaning and Geocoding Process

Before spatial analysis, the beneficiary dataset underwent data cleaning to improve consistency, validity, and spatial reliability. The preprocessing stage included removing duplicate beneficiary records, standardizing address formats, correcting incomplete administrative information, and verifying inconsistencies in the institutional database. Data cleaning is essential in GIS-based analysis because inaccurate or inconsistent address information can generate spatial bias and reduce the reliability of spatial representation (Zheng, 2020).

Following the cleaning process, beneficiary address data were matched with the latitude and longitude coordinates available in the dataset. The geocoding and coordinate verification process was conducted manually using QGIS by checking coordinate positions against the administrative boundary layer of the Special Region of Yogyakarta. The validated coordinates were then converted into point-based spatial data representing the geographical locations of ZIS beneficiaries. Geocoding is a fundamental GIS technique that transforms textual addresses into spatial coordinates for mapping and spatial analysis purposes (Mandal et al., 2021). This process transformed administrative beneficiary records into spatial point data representing the geographical locations of ZIS distribution.

To improve positional reliability, coordinate validation was conducted by cross-

checking the generated coordinates against administrative boundaries and visually verifying them in the QGIS environment. This validation process aimed to minimize mismatched locations, positional inaccuracies, and outlier points that could affect thematic mapping results. Nevertheless, limitations remained because of incomplete address information, inconsistent writing formats, and variations in local administrative naming. These conditions may introduce positional inaccuracies and spatial bias into the resulting spatial visualization.

After geocoding and validation were completed, the coordinate data were integrated with beneficiary attribute data and converted into Comma-Separated Values (CSV) format to ensure compatibility, integration, and data management within the QGIS environment. To protect beneficiary privacy, the analysis was presented at the aggregate subdistrict level, and no personally identifiable beneficiary information was disclosed in the spatial outputs.

Spatial Analysis and Thematic Mapping

Spatial analysis was conducted by importing the administrative boundary layer into QGIS and representing beneficiary locations as point-type spatial data. The spatial analysis was conducted using QGIS version 3.34 "Münster", with the coordinate reference system (CRS) set to WGS 84 / UTM Zone 49S (EPSG:32749). This CRS was selected because it is appropriate for spatial analysis in the Special Region of Yogyakarta, providing accurate distance and area measurements for mapping and spatial aggregation processes. Spatial aggregation was then performed using the "Join Attributes by Location (Summary)" function to calculate the number of beneficiaries within each subdistrict. Spatial

join analysis is commonly applied in GIS-based regional studies because it integrates spatial and attribute information for area-based analysis and regional evaluation (Osmanagich, 2026). The aggregated beneficiary data were visualized using choropleth thematic maps to illustrate the spatial intensity and regional concentration of ZIS distribution.

Choropleth mapping was selected because it effectively represents regional variation, spatial concentration, and distribution inequality within administrative regions (Schiewe, 2021). In this study, choropleth maps were used not only as visualization tools but also as analytical instruments for identifying underserved regions, evaluating institutional accessibility, and examining spatial disparities in beneficiary coverage. The thematic map classification process employed the Natural Breaks method because it is effective for identifying natural groupings and distribution variations within unevenly distributed spatial datasets (Schiewe, 2021). This method minimizes variance within classes while maximizing variance between classes, thereby enabling clearer visualization of spatial inequality and regional concentration patterns across subdistricts. The classification approach was selected to support a more interpretable representation of spatial disparities in ZIS distribution coverage.

Research Limitations

This study has several limitations related to data availability and spatial representation. First, the analysis relied solely on beneficiary data provided by LAZISMU D.I. Yogyakarta for the 2025 distribution period; therefore, it may not represent all ZIS distribution activities conducted by other zakat institutions in the Special Region of Yogyakarta. Second, the completeness and consistency of beneficiary

address information directly influenced the accuracy of the geocoding process and spatial representation. Incomplete or ambiguous address data may introduce positional inaccuracies and spatial bias in the thematic mapping results (Mandal et al., 2021).

Third, subdistrict-level aggregation may not fully capture micro-level spatial disparities at the village or neighborhood scale. Despite these limitations, the GIS-based spatial analysis approach provides important insights into regional accessibility, institutional distribution coverage, underserved areas, and spatial inequality in ZIS distribution. Moreover, this approach demonstrates the potential of GIS as an evidence-based governance instrument for supporting equitable and regionally balanced Islamic social finance planning.

RESULTS AND DISCUSSION

As the initial stage of GIS-based spatial analysis, the distribution of ZIS beneficiaries in the Special Region of Yogyakarta was visualized to identify regional distribution patterns, institutional coverage, and spatial disparities in program implementation. In this study, *tašarruf*, meaning the allocation or distribution of ZIS funds to beneficiaries, is represented spatially as point data. Figure 2 provides an overview of the geographical distribution of ZIS beneficiary locations at the subdistrict level and serves as an initial basis for evaluating spatial accessibility and regional distribution coverage.

The map visualizes beneficiary locations as point-based spatial data representing ZIS distribution locations (*tašarruf*). Each point indicates the geographical location of a recorded beneficiary. Areas with denser point concentrations represent regions with higher distribution intensity and stronger institutional coverage. The point distribution map shows

that ZIS beneficiaries are spatially uneven across subdistricts in the Special Region of Yogyakarta. Several urban and peri-urban areas exhibit relatively dense concentrations, whereas many peripheral regions show sparse distributions or no recorded beneficiaries. This pattern indicates that ZIS program implementation remains spatially concentrated in institutionally accessible areas rather than evenly distributed across regions.

The concentration of beneficiaries in urban-centered areas may be associated with operational accessibility, transportation infrastructure, population density, and institutional outreach capacity. Regions closer to institutional service centers tend to receive greater distribution intensity because they are operationally easier to reach and administratively easier to manage. Similar findings have been reported in studies of social welfare and humanitarian distribution systems, which show that geographical accessibility significantly influences the spatial reach of social assistance programs (Fajrina et al., 2020).

From the perspective of Islamic social finance governance, the spatial concentration of ZIS beneficiaries suggests that institutional accessibility may unintentionally produce uneven distribution coverage across regions. Although operational efficiency remains important, Islamic principles of distributive justice require welfare assistance to be allocated fairly and remain accessible to vulnerable communities regardless of geographical location (Hidayah & Hasan, 2025). These findings therefore emphasize the need for more adaptive, spatially informed, and regionally balanced ZIS distribution planning. To substantiate this interpretation, each subdistrict was classified according to the intensity of ZIS beneficiary distribution at the local level, as presented in Table 1.

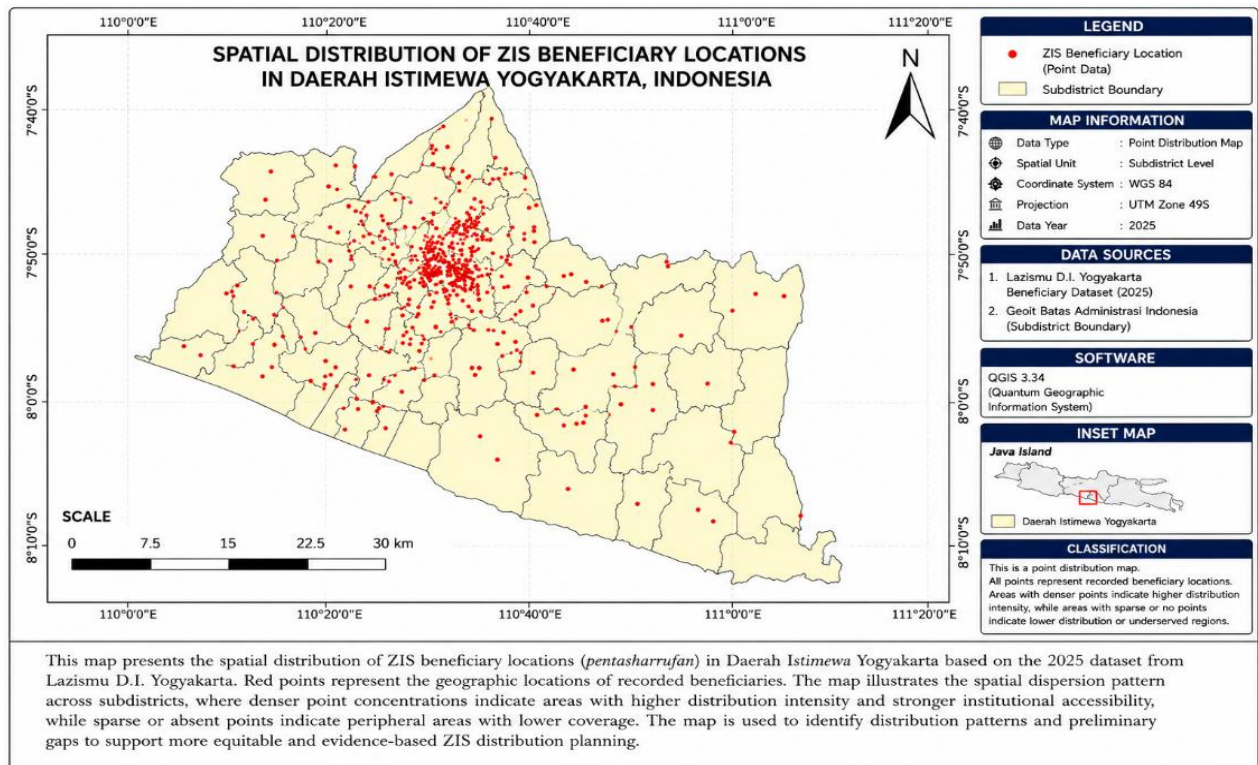


Figure 2. Spatial Distribution of ZIS Beneficiary Locations in the Special Region of Yogyakarta
Source: Authors' analysis of LAZISMU DIY and Geoit data using QGIS 3.34 (2025).

Table 1. ZIS Beneficiary Distribution in D.I. Yogyakarta

Distribution Category	Number of Subdistricts	Representative Subdistricts	Spatial Characteristics
High Distribution (63–305 locations)	2	Kotagede, Umbulharjo	Urban-centered areas with high institutional accessibility
Moderate Distribution (19–62 locations)	3	Depok, Banguntapan, Gamping	Peri-urban areas with relatively good service coverage
Medium Distribution (6–18 locations)	9	Kasihan, Bantul, Kalasan, Wates	Areas with moderate distribution intensity
Low Distribution (1–5 locations)	35	Sanden, Playen, Mlati, Turi	Areas with limited ZIS distribution coverage

Description: Table 1 classifies ZIS beneficiary distribution across subdistricts in D.I. Yogyakarta based on spatial aggregation analysis. The results show that high distribution is concentrated in urban subdistricts with strong institutional accessibility, while moderate and medium distribution appears mainly in peri-urban and transitional areas. Low-distribution subdistricts are mostly peripheral areas with limited service coverage, indicating spatial disparities in ZIS distribution.

To complement the point-based visualization, a choropleth thematic map was developed to present the aggregate spatial intensity of ZIS beneficiary distribution at the subdistrict level. Compared with point distribution maps, choropleth visualization

enables clearer identification of regional disparities because overlapping points in densely distributed areas may obscure variation in distribution intensity. Figure 3 presents the aggregate intensity of ZIS beneficiary distribution at the subdistrict level.

Darker colors indicate higher beneficiary concentrations, whereas lighter colors represent lower distribution intensity or areas without recorded beneficiaries. The choropleth visualization highlights regional disparities and spatial concentration patterns across subdistricts. The classification results show substantial variation in ZIS distribution intensity, with most subdistricts falling into low

to moderate categories and only a few showing high concentrations.

The highest concentration was found in Kotagede Subdistrict, followed by Umbulharjo, Depok, and Banguntapan, which are mainly urban and peri-urban areas characterized by stronger institutional networks, higher population density, better accessibility, and wider service reach.

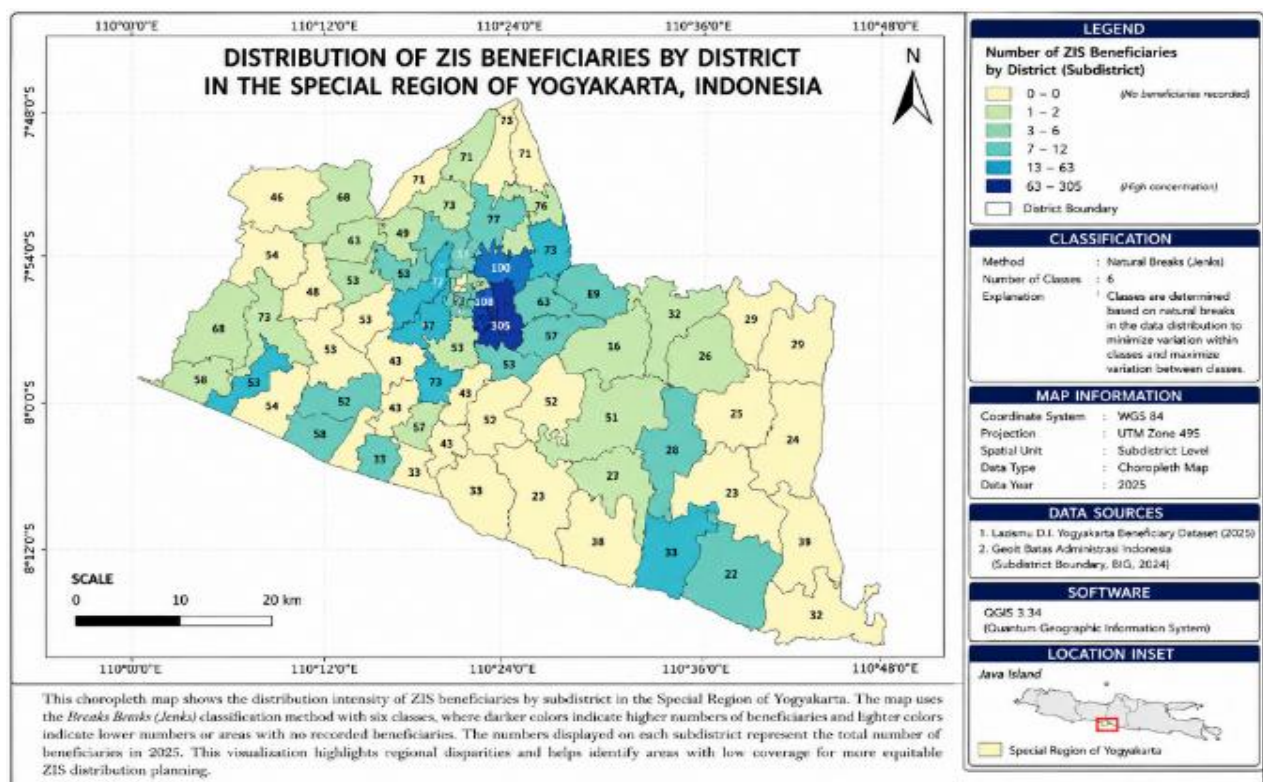


Figure 3. Choropleth Map of ZIS Beneficiary Distribution in D.I. Yogyakarta

Source: Authors' analysis of LAZISMU DIY and Geotik data using QGIS 3.34 (2025).

By contrast, many subdistricts in the western, eastern, northern, and southern peripheral regions of the Special Region of Yogyakarta recorded low distribution intensity or no identified beneficiaries. These regions generally have lower accessibility and are relatively distant from institutional service centers. Spatially, this pattern suggests that ZIS distribution coverage remains concentrated in accessible urban areas, while peripheral regions

experience relatively limited institutional outreach.

This finding supports previous studies indicating that zakat governance systems often prioritize operational efficiency and administrative accessibility over spatial equity and geographical inclusiveness (Efita & Triase, 2024; Sarib et al., 2024). Consequently, underserved regions may receive less attention in the distribution process, even though they

may contain vulnerable populations requiring social assistance. This finding is important because the absence of recorded beneficiaries in certain areas does not necessarily indicate the absence of need; rather, it may reflect limitations in institutional reach, data capture, or distribution coverage.

From the perspective of spatial justice, the unequal distribution pattern identified in this study highlights the importance of integrating spatial accessibility analysis into Islamic social finance governance. Equitable ZIS distribution should not focus only on financial effectiveness; it should also consider balanced regional coverage and fair access to welfare services across geographical areas. GIS-based spatial analysis therefore contributes by identifying underserved regions, evaluating institutional coverage, and supporting evidence-based beneficiary-targeting strategies.

The findings demonstrate that GIS can function not merely as a visualization tool but also as a governance instrument for Islamic social finance planning. Through spatial analysis, zakat institutions can identify regional disparities, evaluate service accessibility, and optimize future outreach strategies based on geographical evidence. In practical terms, the spatial information generated in this study may help improve regionally balanced distribution planning, strengthen institutional outreach in underserved areas, and enhance the inclusiveness of ZIS distribution programs.

Overall, integrating GIS into ZIS distribution analysis contributes to evidence-based Islamic social finance governance. Spatial analysis enables clearer identification of regional disparities, improves institutional evaluation of beneficiary coverage, and supports more equitable and inclusive distribution planning. Accordingly, GIS-based approaches have significant potential to

strengthen distributive justice and regional accessibility in Islamic social finance management.

CONCLUSION

This study aimed to analyze the spatial distribution and accessibility of ZIS beneficiaries managed by LAZISMU D.I. Yogyakarta using a GIS-based approach. Employing a descriptive quantitative method supported by spatial analysis in QGIS, this study examined regional distribution patterns and spatial disparities in beneficiary coverage at the subdistrict level.

The findings indicate that ZIS beneficiary distribution remains spatially uneven, with higher concentrations in urban and institutionally accessible areas, while several peripheral areas recorded low distribution intensity or no identified beneficiaries. These results suggest that institutional accessibility, regional infrastructure, and service reach shape the spatial pattern of ZIS distribution. This study contributes to Islamic social finance governance by positioning GIS not merely as a mapping tool but as an evidence-based instrument for evaluating spatial accessibility, regional inequality, and distribution equity.

Practically, the spatial information generated in this study provides an empirical basis for more adaptive and regionally balanced ZIS distribution planning. However, this study is limited by its reliance on a single institutional dataset from the 2025 distribution period and by potential inaccuracies in beneficiary address geocoding. Future research should incorporate spatiotemporal analysis, socioeconomic indicators, and comparative datasets from multiple zakat institutions to provide a more comprehensive understanding of ZIS distribution dynamics and regional welfare accessibility.

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REFERENCES

- Asya'bani, N., Afifa, U. N., Widiastuti, T., Mawardi, I., & Soleh, M. (2025). Analysis of the impact of zakat fund distribution on mustahik productivity in Indonesia. *Review of Islamic Social Finance and Entrepreneurship*, 177–195. <https://doi.org/10.20885/RISFE.vol4.iss2.art7>
- Daniel, E., & Mbon, N. (2024). Application of Geographic Information Systems (GIS) and the Practice of Public Administration. *AKSU Journal of Administration and Corporate Governance*, 4(2), 233–241. <https://doi.org/10.61090/aksujacog.2024.032>
- Efita, S. D., & Triase, T. (2024). Optimizing Zakat Distribution with GIS and Data Mining in Community Empowerment at BAZNAS Deli Serdang. *Journal of Information Systems and Informatics*, 6(4), 3087–3103. <https://doi.org/10.51519/journalisi.v6i4.942>
- Erni, E., Artis, A., & Rahman, R. (2024). Zakat Management Practices and Sustainable Development in Indonesia. *Sinergi International Journal of Islamic Studies*, 2(1), 24–37. <https://doi.org/10.61194/ijis.v2i1.129>
- Faizah, N., & Haryono, S. (2025). The Impact of the Distribution of Zakat Funds on Poverty Alleviation in Indonesia. *ZISWAF: Jurnal Zakat dan Wakaf*, 12(1), 82. <https://doi.org/10.21043/ziswaf.v12i1.27335>
- Hidayah, Moh. T., & Hasan, D. B. N. (2025). Implementation of Zakat Core Principles in NU CARE LAZISNU Surabaya. *Academia Open*, 10(2). <https://doi.org/10.21070/acopen.10.2025.11249>
- Hidayati, N. (2026). Efektivitas Sistem Pengumpulan Pengelolaan Pendistribusian Dana Zakat Infak dan Shadaqah (Studi Kasus Baznas Kabupaten Lombok Timur). *Jurnal Ekonomi, Manajemen, Akuntansi Dan Keuangan*, 7(1), 8. <https://doi.org/10.53697/emak.v7i1.3395>
- Kamaludin Yusup, D., Sobana, D. H., & Fachrurazy, F. (2021). The Effectiveness of Zakat Distribution at the National Zakat Agency. *AL-'ADALAH*, 18(1), 55–76. <https://doi.org/10.24042/adalah.v18i1.912>
- Maisyarah, A., & Hamzah, M. Z. (2024). Zakat Distribution Management: A Systematic Literature Review. *Suhuf*, 36(1), 95–108. <https://doi.org/10.23917/suhuf.v36i1.4357>
- Mandal, D., Lin, B., Zhou, B., & Yang, M. (2021). Visualizing and Evaluating the Geocoding Uncertainty in Social Sensing for Disaster Management. *Abstracts of the ICA*, 3, 1–3. <https://doi.org/10.5194/ica-abs-3-192-2021>
- Mukti, T., Maytesa, Y., Kholis, N., Mukharrom, T., & Eka Aliyanti, F. (2022). An Analysis of The Effectiveness of Zakat Distribution at Baznas Indonesia During The Covid-19 Pandemic: A Disbursement Collection Ratio Approach. *KnE Social Sciences*, 16–24. <https://doi.org/10.18502/kss.v7i10.11338>
- Rita Uchenna Attah, Baalah Matthew Patrick Garba, Ifechukwu Gil-Ozoudeh, & Obinna

- Iwuanyanwu. (2024). Leveraging geographic information systems and data analytics for enhanced public sector decision-making and urban planning. *Magna Scientia Advanced Research and Reviews*, 12(2), 152-163. <https://doi.org/10.30574/msarr.2024.12.2.0191>
- Sari, D. N., Faridatussalam, S. R., Ma'sum, Moh. A., & Labiba, H. A. (2023). Spatial Analysis of E-Warong Distribution for Basic Food Social Assistance Program in Surakarta City. *Journal of Applied Geospatial Information*, 7(1), 787-795. <https://doi.org/10.30871/jagi.v7i1.5165>
- Sarib, S., Hayati, F. A., Mokodenseho, S., Lantong, S. M., & Mamonto, M. (2024). Analysis of the Role of Zakat, Sadaqah, and Infaq in the Community Economy for Poverty Alleviation in Indonesia. *West Science Islamic Studies*, 2(02), 71-79. <https://doi.org/10.58812/wsiss.v2i02.820>
- Schiewe, J. (2021). Data classification methods for preserving spatial patterns. *Proceedings of the ICA*, 4, 1-6. <https://doi.org/10.5194/ica-proc-4-95-2021>
- Schiewe, J. (2024). Task-Oriented and Change-Preserving Data Classification for Multi-Temporal Choropleth Maps. *KN - Journal of Cartography and Geographic Information*, 74(1), 17-27. <https://doi.org/10.1007/s42489-024-00163-z>
- Suhendar, M. I., Setyowat, E., & Rosyadi, I. (2022). Influence of distribution of zakat, Infaq And Shadaqah (ZIS), inflation and human capital on economic growth in Indonesia 2002-2021. *Fair Value: Jurnal Ilmiah Akuntansi Dan Keuangan*, 4(9), 4130-4140. <https://doi.org/10.32670/fairvalue.v4i9.1616>
- Yuniarti, R., Hilal, S., & Fasa, M. I. (2023). Pendistribusian Zakat Produktif Dalam Mensejahterakan Mustahik Atas Dana Zakat Yang Dikelola Baznas Provinsi Lampung. *EKSISBANK: Ekonomi Syariah Dan Bisnis Perbankan*, 7(2), 244-252. <https://doi.org/10.37726/ee.v7i2.879>
- Zheng, Q. (2020). Discussion on the Application of Geographic Information System in Urban Ecological Environment Management under the Background of Big Data. *OALib*, 07(11), 1-7. <https://doi.org/10.4236/oalib.1106904>