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Ummat-Ecomap: Strategic analysis of spatial based digital innovation for ziswaf optimization in economic development

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ABSTRACT

Background: The size of the population with a majority religion does not make an area prosperous. As a city with a Muslim population of 98.5%, Tasikmalaya—also known as the city of waqf—still faces socio-economic contradictions in the form of high poverty and unemployment rates. The potential for Zakat, Infak, Sedekah, and Wakaf (ZISWAF) funds in this region is enormous, but their contribution to poverty alleviation has not been optimal due to conventional management patterns that are not based on accurate data. Although previous studies have shown the strategic role of Islamic philanthropy in economic empowerment, its effectiveness is often hampered by limited transparency and minimal use of spatial data. Therefore, this study aims to formulate the UMMAT-EcoMap concept as a digital instrument to optimize the strategic and sustainable distribution of ZISWAF. **Methods:** This study uses descriptive qualitative approach with a literature review design combined with spatial analysis. The analytical framework integrates Geographic Information Systems (GIS) and unbalanced growth theory to map pockets of poverty, regional characteristics, and the potential of relevant local economic sectors as targets for ZISWAF utilization. **Findings:** The results show that UMMAT-EcoMap enables increased accuracy in ZISWAF distribution through real-time mapping based on welfare indicators and sectoral potential. In line with Hirschman's theory, this approach has the potential to create growth poles in leading sectors supported by ZISWAF funds, thereby promoting economic spillover effects for other supporting sectors and regions. **Conclusion:** UMMAT-EcoMap is a strategic innovation that synergizes spatial analysis with Islamic philanthropy governance, thereby increasing the effectiveness, transparency, and impact of ZISWAF in accelerating poverty alleviation in Tasikmalaya. **Novelty/Originality of this article:** The novelty of this research lies in the integration of Geographic Information Systems (GIS) with Unbalanced Growth Theory (Hirschman's Theory) to transform Islamic philanthropy (ZISWAF) management.

KEYWORDS: alms; infak; spatial analysis; waqf; zakat.

1. Introduction

Tasikmalaya plays a vital sociological role as the center of Islamic civilization in West Java. This is reflected in the Muslim population, which reaches 98.5%, and the existence of more than 278 Islamic boarding schools (Badan Pusat Statistik Kabupaten Tasikmalaya, 2025; Wikipedia, 2024), earning it the nickname Kota Santri (City of Islamic Students). Tasikmalaya is divided into two regions, namely the regency and the city, each of which has a large population. The population of Tasikmalaya City is 759,370 (Badan Pusat Statistik Kota Tasikmalaya, 2024) and Tasikmalaya Regency has a population of 1,920,920 in 2024

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(Badan Pusat Statistik Kabupaten Tasikmalaya, 2025). Both regions have abundant natural resources with vast agricultural and plantation lands that support the local economy, a comprehensive MSME network, and numerous potential natural attractions and creative industries, such as embroidery, handicrafts, and geulis umbrellas, which are the main icons of Tasikmalaya that can attract investors to participate in strengthening the community's economy. and directly creating significant opportunities to generate new jobs and enhance the competitiveness of local products. However, this potential will not be fully realized without adequate capital support, business assistance, and market access.

Historically, the management of Islamic philanthropy in Indonesia has undergone a gradual institutional transformation. In earlier periods, the collection and distribution of zakat, infak, sedekah, and wakaf were predominantly carried out through informal community networks, such as mosques, pesantren, and local religious leaders. Although this traditional model reflected strong social solidarity, its implementation often lacked structured governance, standardized reporting mechanisms, and integrated development planning. The establishment of formal institutions such as BAZNAS and various Amil Zakat Institutions marked an important milestone in improving the professionalism of ZISWAF management. Over time, regulatory frameworks and financial accountability standards have also been strengthened to ensure that philanthropic funds contribute more systematically to social welfare (Ridho et al., 2025).

Despite these improvements, the digital transformation of ZISWAF governance remains uneven, particularly at the regional level. Many local institutions still rely on conventional administrative systems that prioritize manual documentation rather than integrated digital platforms. This condition creates several structural limitations, including fragmented data management, limited transparency, and difficulties in identifying priority beneficiaries. In the context of regional economic empowerment, these limitations become more significant because philanthropic interventions require accurate information regarding poverty distribution and the economic characteristics of each locality. Without adequate technological support, decision-making processes often depend on subjective assessments or incomplete datasets, which ultimately reduce the effectiveness of empowerment programs (Aini et al., 2024).

Furthermore, the absence of spatially integrated data systems has created challenges in aligning philanthropic resources with regional development priorities. In many cases, zakat distribution focuses primarily on consumptive assistance rather than long-term economic empowerment (Makhrus & Saepudin, 2023). As a result, philanthropic funds have not yet fully functioned as catalysts for productive economic transformation across many local communities and emerging economic sectors. This condition indicates the need for innovative approaches that combine digital technology, spatial analysis, and Islamic economic principles in order to ensure that ZISWAF can generate sustainable socio-economic impact for inclusive regional development in the future (Efita & Triase, 2024).

The most strategic resource to support economic empowerment in Tasikmalaya is ZISWAF (Zakat, Infak, Sedekah, and Wakaf). The title “City of Wakaf” was given by the Ministry of Religious Affairs/*Kementerian Agama*, legitimizing the enormous potential for Islamic philanthropy in this region. Recent data shows a significant accumulation of Zakat, Infak, Sedekah, and Wakaf (ZISWAF) funds in Tasikmalaya. Based on the 2024 financial report of BAZNAS Tasikmalaya Regency, Zakat receipts amounted to Rp 18.5 billion, an increase of 26.5% from the previous year, while infak or sedekah amounted to Rp 6.55 billion, bringing the total receipts to Rp 25.5 billion and more than Rp 25.26 billion distributed (BAZNAS Kota Tasikmalaya, 2024). Then, zakat fund receipts in Tasikmalaya City reached IDR 4.35 billion, and there was an increase in 2024 to IDR 7.78 billion, with infak or alms amounting to IDR 217 million, with total receipts reaching IDR 4.5 billion (BAZNAS, 2021). Additionally, the number of waqf lands in Tasikmalaya Regency reached 7,989 with a total area of 579.38 hectares, while there were approximately 1,944 lands with an area of 96.53 hectares in Tasikmalaya City (Kementerian Agama Republik Indonesia, 2025).

However, behind these impressive collection figures lies a sharp development paradox. Tasikmalaya City is listed as the third poorest city in West Java, followed by Tasikmalaya Regency in seventh place. The Central Statistics Agency/*Badan Pusat Statistik* reports that the poverty rate in this region remains at 11.10% with an open unemployment rate of 6.43% (BPS Kabupaten Tasikmalaya, 2025). This phenomenon indicates structural obstacles in the mechanism of ZISWAF fund transmission towards strengthening the real economy of the community.

The high poverty rate in Tasikmalaya is caused by many factors, such as weak local economic growth, an employment structure dominated by the informal sector, low quality of human resources, with Tasikmalaya's Human Development Index (HDI) recorded at 76.59, ranking 91st out of 98 cities throughout Indonesia (BPS Kabupaten Tasikmalaya, 2025), limited job opportunities, and an unstable economy. Theoretically, poverty is not merely a matter of low income, but rather a condition of capability deprivation that prevents individuals from developing substantially (Fragoso, 2024).

In the context of Islamic economic development, strengthening the economy of the Muslim community must be based on the principles of Maqashid Syari'ah, which emphasizes a balance between spiritual, ethical, and socially equitable aspects (Farma & Umuri, 2021).). The ZISWAF instrument should function as a wealth redistribution mechanism capable of transforming mustahik (zakat recipients) into muzakki (zakat givers) through productive empowerment (Afrina, 2020; Islam & Zakat, 2021). However, the literature notes that ZISWAF management in Indonesia is often trapped in a pattern of short-term charitable distribution and is not supported by transparency and accurate data (Sugita et al., 2020). Inequality in distribution often occurs because Zakat Management institutions do not yet have the instruments to map the geographical conditions of the region with precision.

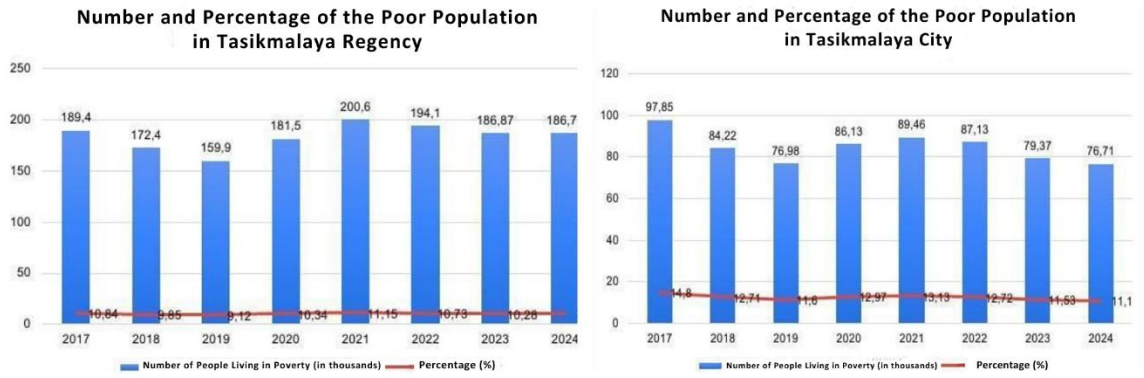


Fig. 1. Percentage of poor population in Tasikmalaya from 2020 to 2024
(BPS Kota Tasikmalaya, 2024)

This is where the important role of Spatial Analysis based on Geographic Information Systems (GIS) comes in. In practice, spatial analysis enables the processing of location data related to socio-economic phenomena on the earth's surface (Latue, 2023). Using overlay and data visualization methods, GIS can provide interactive information about which areas require urgent (Mathenge et al., 2022). The integration of digital technology in the management of Islamic philanthropy is a necessity to improve the accountability and effectiveness of empowerment programs (Saputri et al., 2024). In addition, effective development strategies can refer to Albert Hirschman's Unbalanced Growth theory, which states that economic acceleration can be achieved by focusing investment on leading sectors to create a trickle-down effect for other sectors (Zaenurrosyid et al., 2024). The Tasikmalaya government has made numerous efforts to reduce poverty rates, such as integrating e-government and poverty databases, distributing social assistance and job training, and collaborating on productive ZISWAF programs in Lumbung Desa (Adamn et al., 2018;

Deffinika et al., 2024). This is evident in the year-on-year decline in poverty rates, as shown in the following graph (see Fig. 1).

Despite a significant decline in poverty rates, the government's acceleration efforts are still less than optimal, given that this decline in poverty rates is relatively small. This condition shows that the success of poverty reduction in Tasikmalaya City is still dominated by conventional and fragmented programmatic approaches (Hayati & Soemitra, 2022). Interventions tend to focus on the distribution of aid and increasing individual capacity, but have not yet fully addressed the aspect of integrated regional-based economic potential mapping (Ahmed et al., 2025). As a result, poverty alleviation programs have not been able to drive sustainable economic transformation among the poor, particularly in optimizing the advantages of local sectors that have a high leverage effect on income growth. In addition, limitations in cross-sector data integration have an impact on weak planning, program targeting, and evaluation of poverty alleviation policies. The research gap identified at present is the absence of a digital platform that synergizes BPS poverty demographic data with maps of local economic potential (such as the embroidery sector, geulis umbrella industry, and agriculture) in a real-time ZISWAF monitoring ecosystem. Most existing systems are still administrative-textual in nature without a spatial perspective (Sinurat, 2023).

Therefore, based on these gaps, this study aims to formulate the concept of UMMAT-EcoMap, a digital innovation based on spatial analysis to optimize the distribution of ZISWAF funds in Tasikmalaya. The originality (state of the art) of this study lies in the combination of GIS spatial mapping methods with the theory of unbalanced economic growth to determine the most strategic points of intervention for ZISWAF capital, as well as presenting an evidence-based policy approach in planning economic empowerment for the community (Kurniawan & Ramadhan, 2025).. Specifically, this study is designed to achieve four main objectives, namely as follows, First, to explain the urgency of the UMMAT-EcoMap design in overcoming poverty; to identify the economic potential of the region through spatial data collection methods; to explain the role of the platform in encouraging strategic allocation of ZISWAF funds; and to formulate implementation steps to maximize the performance of economic development for the community. Thus, the output of this review is expected to serve as a policy reference for local governments and amil institutions in realizing an inclusive, data-driven, adaptive, and sustainable digital transformation of Islamic philanthropy that is oriented towards the economic empowerment of the poor.

2. Methods

This study uses a descriptive qualitative approach with a literature review design synthesized with spatial analysis techniques. This study is constructed through the collection of academic narratives and statistical data, which are then visualized to produce evidence-based solutions related to the optimization of ZISWAF funds.

2.1 Research location and time

The geographical focus of this study covers the administrative areas of Tasikmalaya. The approach was chosen ontologically to understand the complexity of socio-economic phenomena in Tasikmalaya through comprehensive interpretation of secondary data. Epistemologically, knowledge in this City and Tasikmalaya Regency, West Java. The location was chosen based on the significance of the region as a “Waqf City” and “Santri City” which has a paradox between high Islamic philanthropy potential and poverty rates that are above the national average. The research was conducted from late 2024 to early 2025 to obtain the latest statistical data from the Central Statistics Agency/*Badan Pusat Statistik (BPS)* and the latest BAZNAS financial reports.

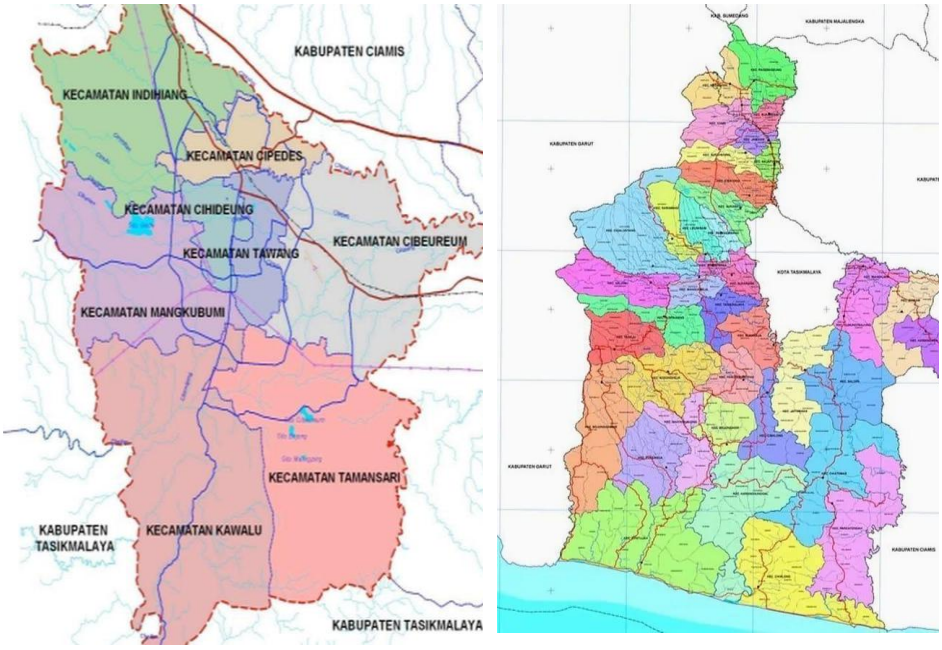


Fig. 2. Map of Tasikmalaya City and Tasikmalaya Regency as the focus location of the study

2.2 Data sources and collection techniques

The data used in this study is secondary data sourced from official Documents: BPS poverty reports for 2023-2024, BAZNAS financial reports for Tasikmalaya City and Regency for 2021-2024, and data on the area of waqf land from the Ministry of Religious Affairs. Academic literature, Scientific journals, textbooks, and previous research articles on ZISWAF management, Geographic Information Systems (GIS), and economic growth theory. Spatial data, geographic coordinates and mapping of economic potential areas in Tasikmalaya obtained through digital observation.

2.3 Theoretical Components and Analysis

As a review article, the main theoretical components integrated include spatial analysis (GIS), used to model the geographical relationship between the location of poverty pockets and the availability of local economic assets (Latue, 2023). Uneven growth theory (*Hirschman*), used as the basis for determining the leading sectors to be funded by ZISWAF in order to trigger a trickle-down effect. In addition, this study operationalizes several socio-economic variables into measurable spatial indicators that can be visualized within the UMMAT-EcoMap framework. The main variables include poverty level, economic potential, and the distribution of ZISWAF funds. The poverty level indicator is derived from the percentage of poor households in each district based on BPS statistics. These data are then converted into spatial attributes by linking statistical values to geographic coordinates of administrative areas. Each district is represented as a spatial data point that reflects the intensity of poverty conditions in that area.

The economic potential variable is operationalized by identifying clusters of productive sectors such as agriculture, creative industries, small-scale manufacturing, and tourism. These sectors are mapped using geographic layers that represent the distribution of local economic resources. Meanwhile, the ZISWAF distribution variable is obtained from BAZNAS reports and spatially linked to the locations where philanthropic programs are implemented. Through this process, the EcoMap system integrates welfare indicators, economic resources, and philanthropic flows into a unified spatial dataset that can be analyzed to determine strategic intervention areas.

2.4 Data processing procedures

The data analysis stages follow the qualitative data condensation model as follows: data condensation (coding), categorizing data based on poverty level variables, the amount of ZISWAF collected, and the type of economic potential (agriculture, tourism, creative industries). Data display, coded data is then spatially mapped using color visualization concepts (green, yellow, orange, red) to show the gradation of regional priorities. The features of the UMMAT-EcoMap application are designed as a visual representation of the results of this data processing. Connecting spatial findings with Islamic economic theory to formulate recommendations for productive and transparent ZISWAF fund allocation policies. This procedure ensures that the UMMAT-EcoMap design is not merely a digital concept, but an instrument built on a scientifically accountable methodology.

3. Results and Discussion

This chapter presents the in-depth results and discussion regarding the development paradox in the Tasikmalaya region, where high religious social capital has not yet been directly proportional to the improvement of community welfare. The discussion begins with a fundamental analysis of the region's socio-economic conditions and the urgency of digital innovation as a means of breaking the chain of structural poverty. Furthermore, this chapter elaborates on the innovative design of UMMAT-EcoMap as a spatial-based solution, examines its implementation through the lens of the Unbalanced Growth Theory, and projects the long-term impacts on the governance of Islamic philanthropy and sustainable welfare in Tasikmalaya City.

3.1 Analysis of socio-economic conditions and the urgency of digital innovation

The results of this study highlight a sharp development anomaly within the Tasikmalaya region. Sociologically, the region possesses robust social capital, legitimized by its designation as the "City of Santri" and "City of Waqf," supported by a Muslim population of 98.5% and the existence of over 278 Islamic boarding schools (*pesantren*). However, the strength of this religious social capital stands in stark contrast to the reality of community welfare. According to BPS Kota Tasikmalaya (2024), Tasikmalaya City remains positioned as the third poorest city in West Java, with a poverty rate persisting at 11.10%. This condition is further exacerbated by an Open Unemployment Rate (TPT) of 6.45%, indicating that the real sector has not yet been able to optimally absorb the workforce despite the strong community base.

A deeper analysis reveals a critical inefficiency in the transmission mechanism of philanthropic funds. Financial reports from BAZNAS Kota Tasikmalaya (2024) record an impressive surge in zakat collection, increasing by 26.5% to IDR 18.5 billion. By economic logic, this significant increase in social fund liquidity should correlate positively with a reduction in poverty rates. However, the fact that poverty remains stagnant in double digits suggests that the collected ZISWAF funds have not effectively targeted the root causes of deprivation (Ramadhan et al., 2023). The funds are indicated to be predominantly absorbed into short-term consumptive channels (charity) rather than sustainable productive empowerment.

This study identifies that the root cause of this distributional stagnation is the absence of a spatial perspective in decision-making. Without spatial technology assistance, zakat management institutions face "blind spots" in identifying the precise location of poverty pockets and the specific economic potential of those areas. Consequently, a distributional disparity occurs where aid accumulates in easily accessible zones, while remote areas facing extreme poverty yet possessing latent potential in agriculture or local crafts remain underserved by capital. Thus, the urgency of digital innovation through UMMAT-EcoMap is

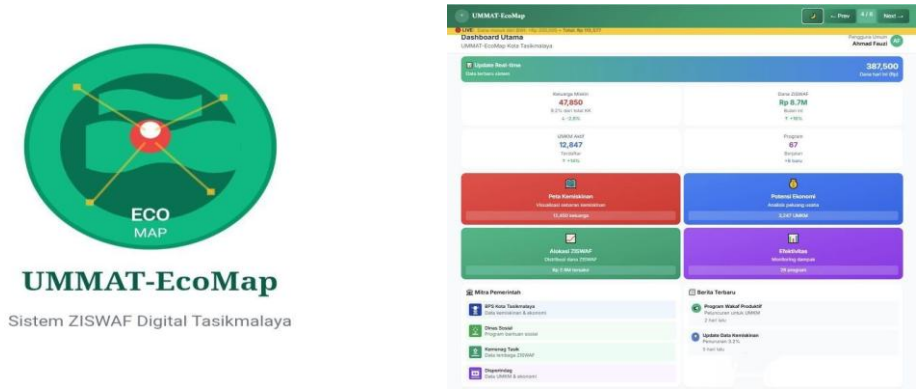
inevitable to shift the distribution pattern from random allocation to precision, evidence-based policy (Nurhutami et al., 2024).

The implementation of this spatial-based solution is projected to deliver three systemic impacts on the Islamic economic ecosystem in Tasikmalaya. First, enhanced allocative efficiency**.** By visualizing poverty data and economic potential on a single integrated map, the risks of exclusion errors (eligible poor not receiving aid) and inclusion error (ineligible individuals receiving aid) can be significantly minimized. Interventions will no longer be generalized but tailored to regional typologies or instance, agricultural tools for agrarian poverty pockets and creative capital for home-industry zones.

Second, the acceleration of leading sectors**.** Referencing Hirschman's Unbalanced Growth Theory, ZISWAF capital intervention guided by UMMAT-EcoMap will be directed toward sectors with high leverage (leading sectors), such as the embroidery industry centers and the Geulis umbrella crafts, which currently suffer from capital constraints. Capital injection at these strategic points is expected to trigger a multiplier effect, creating new jobs and reducing the high open unemployment rate. Third, the strengthening of public trust. The transparency offered by the digital system allows *muzakki* to monitor in real-time where their funds are distributed and the impact generated. This aligns with the principles of Good Amil Governance, which will ultimately stimulate an increase in ZISWAF collection in future periods, creating a sustainable virtuous cycle to transform *mustahik* into new *muzakki* (Latifah & Lubis, 2020).

3.2 UMMAT-EcoMap innovation design based on spatial analysis

As a solution to the structural inequalities in ZISWAF distribution identified in the previous section, this study proposes the UMMAT-EcoMap framework. Designed as a spatial decision support system, UMMAT-EcoMap synergizes Geographic Information System (GIS) technology with economic development data to provide a layered visualization of poverty severity and regional economic potential. The UMMAT-EcoMap architecture goes beyond simple mapping; it serves as an analytical tool that overlays demographic poverty data (from BPS) with local asset mapping (MSME clusters, agricultural land, and tourism zones). Figure 3 illustrates the visual identity and user interface of the prototype, designed to be easily accessible to both policymakers (Amil Institutions) and the public (Muzakki). The primary strength of UMMAT-EcoMap lies in its ability to translate the complexity of poverty data into Priority Zone Classifications.



(a) (b)

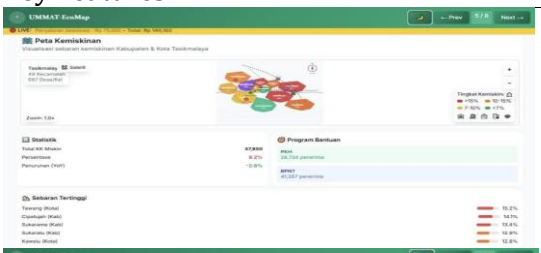
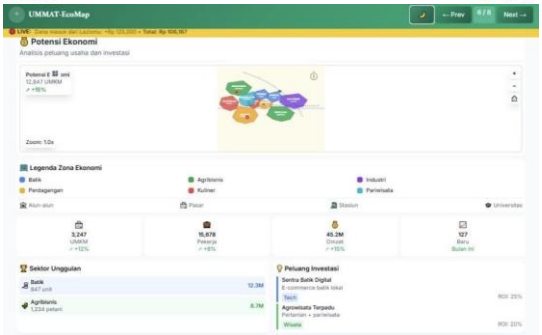
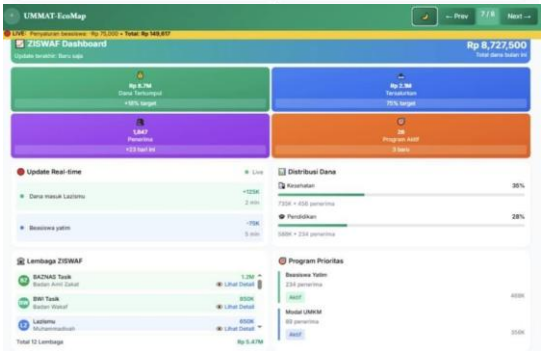
Fig. 3. (a) UMMAT-EcoMap logo; (b) GIS-Based interactive dashboard prototype

As illustrated in the mapping feature, the system divides the Tasikmalaya region into color gradations with distinct policy implications, red zone (urgent relief), areas experiencing extreme poverty and minimal infrastructure. In these zones, the system will recommend interventions in the form of Consumptive *Zakat* (fulfillment of basic needs) as

the communities are not yet ready to receive business capital. Yellow/orange zone (empowerment ready), areas with moderate poverty levels but possessing economic potential (villages with fertile land but lacking farming tools). Here, the system recommends Productive *Zakat/Waqf* to stimulate growth. Green zone (sustainable growth), areas that are relatively self-sufficient economically, projected to serve as new donor (*Muzakki*) bases.

The system's operational capability is anchored by four core features, as detailed in table 1. These features are designed to transform raw data into actionable insights, facilitating a paradigm shift for *Amil institutions* from a 'charity based' approach to an 'empowerment based' model. Conceptual testing demonstrates that integrating these features establishes a transparent monitoring ecosystem and streamlines the determination of distribution priority scales.

Table 1. Matrix of key features and strategic functions of UMMAT-EcoMap

Key Features	Strategic Functions and Outputs
	Classification of priority areas (red, orange, yellow, green)
	Identification of leading sectors (agriculture, creative industries, tourism)
	Transparency of incoming and outgoing funds and Monitoring the transformation of mustahik into muzakki

By leveraging this matrix, UMMAT-EcoMap ensures that ZISWAF funds are not merely distributed but rather invested. The Spatial Poverty Zoning feature prevents the accumulation of aid in urban centers, while the Geo-Economic Potential Overlay ensures that rural areas receive assistance aligned with their specific agrarian or creative industry capacities.

3.3 Implementation of the unbalanced growth theory and trickle-down effect

The discussion on the effectiveness of the UMMAT-EcoMap system has a strong theoretical correlation with the Unbalanced Growth Theory proposed by Abrori & Kharis (2022). In the context of economic development in Tasikmalaya, this study argues that the region cannot pursue a "balanced investment" strategy across all sectors simultaneously

due to limited capital resources. Instead, poverty alleviation strategies should focus on creating "Growth Poles" in leading sectors precisely identified through spatial analysis. By utilizing the Geo-Economic Potential Overlay feature on UMMAT-EcoMap, the application of Hirschman's theory is operationalized through three strategic mechanisms as follows.

Growth pole identification, the system works by isolating regions with the highest comparative advantage. Based on mapping data, UMMAT-EcoMap has designated the Embroidery Industry Center in Kawalu District and the Agrotourism/Agriculture belt in Tasikmalaya Regency as top priority zones. These regions have high labor absorption capacity but have stagnated due to a lack of capital.

Strategic capital injection (ZISWAF), unlike conventional methods that tend to distribute zakat funds sporadically and evenly, UMMAT-EcoMap facilitates the massive accumulation of ZISWAF capital into these growth poles. The goal is to create a "deliberate economic imbalance" to provide a big boost in productivity in the real sector. Trickle-down effect mechanism, concentrated growth in key sectors will trigger a chain reaction through backward and forward linkages. For example, capital injection into the embroidery industry not only improves the welfare of artisans but also increases demand for raw materials upstream and logistics or marketing services downstream. This is the mechanism that allows economic benefits to trickle down to the poorest segments of society around the growth poles.

Furthermore, the spillover effects from these growth poles are not confined solely to the sub-district where the investment is concentrated; they specifically permeate into neighboring vulnerable sub-districts. As a concrete illustration, the capital intervention directed by UMMAT-EcoMap towards the embroidery industry center in Kawalu Sub-district (identified as a growth pole) will increase the aggregate demand for supporting raw materials, such as fabric, thread, and accessories. This demand for inputs opens opportunities for micro-enterprises and poor households in neighboring sub-districts, for instance, Cipedes or Tamansari Sub-districts, which have long possessed similar potential but have been hindered by limited market access and capital. Through this mechanism of backward linkages, the flow of capital from Kawalu indirectly stimulates economic activity in these surrounding areas.

Moreover, the expansion of production capacity in Kawalu will create new job opportunities that cannot be fully met by the local workforce alone. This encourages labor mobility between sub-districts, where residents from areas with high poverty rates (red or orange zones in neighboring sub-districts) can be absorbed as production workers or other support staff. The income they earn is then re-spent in their place of residence, creating a local multiplier effect. Consequently, concentrated growth in Kawalu is able to pull resources (labor) from surrounding poor areas and push welfare impacts back into those areas.

UMMAT-EcoMap plays a crucial role in visualizing these inter-regional linkage potentials. By overlaying maps of economic potential with spatial poverty data, the system not only identifies a single growth pole but also maps potential supplier networks from neighboring sub-districts and labor mobility corridors. As a result, ZISWAF interventions can be designed not only as capital injections at the growth pole but also as capacity-building programs for suppliers in the surrounding areas. This ensures that the spillover effect occurs in a planned manner, rather than being a mere expectation, so that vulnerable areas around the growth pole also benefit from the growth and gradually escape the poverty trap. Mathematically, the total welfare impact in the UMMAT-EcoMap ecosystem is not a momentary event, but rather an accumulative process. This dynamic is modeled as the integration of the efficient distribution of ZISWAF funds by spatial technology, coupled with the structural added value of industrial linkages, as expressed in Equation 1.

$$W = \int_{t=0}^{n} (Z(t) \cdot e) + \Delta L \qquad \text{(Eq. 1)}$$

This mathematical model of welfare impact is measured through several key components that interact with one another. The first component is the total welfare impact (TWI), which is the accumulated welfare value collected from the initial period to the final period. This value is influenced by F(t), which is the volume of ZISWAF funds distributed over a specific time period (t). Additionally, this calculation incorporates the Spatial Efficiency Coefficient (e) generated by UMMAT-EcoMap, where a higher level of map precision causes this coefficient's value to approach 1. Finally, this model also accounts for the variable L, which represents the structural value added generated from industrial linkages or the trickle-down effect within the local supply chain. This integral equation provides a crucial quantitative justification that merely increasing the volume of zakat funds (Z) will not be optimal without the spatial efficiency coefficient (e) and the creation of economic linkages (ΔL). UMMAT-EcoMap serves as the intervention variable that maximizes both e and ΔL, thereby accelerating poverty alleviation significantly faster than traditional, sporadic distribution methods.

3.4 Implications for welfare and sustainable development

Further discussion revealed that UMMAT-EcoMap has comprehensive systemic implications for three key stakeholders. First, for local governments, the application serves as a precision policy planning instrument. By synchronizing data on poverty and regional potential, the government can avoid overlapping social assistance and focus supporting infrastructure on identified "Growth Poles."

Second, for the ZISWAF Management Institution (*Amil*), this system is a catalyst for the implementation of Good *Amil* Governance. Visual transparency presented in real-time addresses the challenge of public accountability, which in turn is projected to increase the trust of *Muzakki* to distribute their funds through formal channels. Third, for the Community (*Mustahik*), this system no longer positions them as passive objects of assistance, but rather as subjects of empowerment. Through a capital scheme in the local leading sector, new sustainable job opportunities are opened, facilitating the vertical transformation from *Mustahik* to *Muzakki*.

Compared to previous research by Anisa (2025), which emphasized the use of Participatory Action Research and GIS in general, UMMAT-EcoMap offers a more specific novelty. This novelty lies in the integration of Hirschman's economic theory into a spatial decision algorithm. UMMAT-EcoMap not only maps (static) poverty locations but also provides dynamic economic intervention recommendations based on an analysis of industrial linkages. This demonstrates that the synergy between Islamic philanthropy and geospatial technology can address the challenges of poverty systemically, not merely symptomatically. This innovation directly supports the achievement of the Sustainable Development Goals (SDGs), specifically Point 1 (No Poverty) through asset-based economic empowerment (Xu et al., 2021), and Point 10 (Reduced Inequality) through accurate and spatially equitable wealth redistribution mechanisms in Tasikmalaya.

3.5 Integration of public policy and collaborative governance

The implementation of UMMAT-EcoMap in Tasikmalaya represents more than just technology adoption; it is an imperative for transforming poverty alleviation governance from a fragmented approach to a systemically integrated one. The fundamental challenges that hinder the effectiveness of regional development are often not solely due to budget constraints, but rather due to information asymmetry and silo mentality (sectoral ego) among stakeholders. From a public policy perspective, UMMAT-EcoMap is designed to function as a "boundary object," a neutral digital platform that bridges the database and communication gap between local governments (Bappeda and the Social Service) and Islamic philanthropic institutions (BAZNAS and LAZ).

Operationally, the urgency of this integration is based on the critical need for data interoperability. To date, the government-managed Integrated Social Welfare Data (DTKS) has tended to be static with a slow update cycle, while the dynamics of community economic vulnerability on the ground fluctuate in real time. UMMAT-EcoMap offers a solution mechanism through cross-validation, the government provides a macro poverty data framework, while the Amil network and communities verify micro conditions on the ground through application input. This mechanism directly supports the implementation of Presidential Regulation No. 39 of 2019 concerning One Data Indonesia, which requires accurate, up-to-date, and shareable data standards across agencies to minimize the risk of overlapping assistance and exclusion errors.

Furthermore, the governance framework within this ecosystem is strengthened through the adoption of the Quadruple Helix synergy model, which maps the proportional division of strategic roles. Government (regulator) uses the economic potential map generated by UMMAT-EcoMap as an evidence-based tool in developing the Regional Government Work Plan/*Rencana Kerja Pemerintah Daerah (RKPD*). This ensures that physical infrastructure development (such as roads or irrigation) is precisely targeted at "Growth Poles," which are also the targets of ZISWAF capital interventions. Amil institution (executor) acts as a "strategic fiscal partner" for local governments. Given the limited fiscal space of rigid and bureaucratic regional budgets, ZISWAF funds serve as a complementary instrument, filling the gap with a more flexible, faster, and personal empowerment-based distribution scheme. Academics (evaluators), act as quality assurance who maintain the validity of spatial analysis methodology and carry out periodic social impact measurements (Social Return on Investment) to ensure the program runs according to scientific corridors. Community (participants), through the participatory reporting feature, the community is transformed from a passive object receiving aid into an active subject carrying out a social control function, ensuring transparency and accountability in the distribution of public funds. Thus, UMMAT-EcoMap serves not only as a technical instrument but also as a catalyst for concrete bureaucratic reform. This synergy creates a coherent policy ecosystem, where poverty interventions are no longer fragmented but orchestrated within a single inclusive, transparent, and sustainable development roadmap .

3.6 Long-term impact projection: Sharia circular economy model

The culmination of the UMMAT-EcoMap ecosystem implementation is not merely the digitalization of zakat administration, but rather a fundamental restructuring of the regional economic architecture toward a Sharia Circular Economy (Ajustina & Nisa, 2024). This section outlines the long-term projections of this ecosystem, analyzing how spatial precision can transform linear philanthropic interventions into a self-sustaining cycle of wealth creation and redistribution.

Traditionally, Islamic philanthropy in Tasikmalaya operates within a linear model, funds are collected, distributed for consumption, and effectively "disappear" from the economic cycle after use. UMMAT-EcoMap disrupts this trajectory by constructing a circular velocity of money. In this projection model, spatial data serves as the primary blueprint for capital flows. Funds collected from *Muzakki* (donors) residing in the "Green Zone" (areas of economic surplus) are not randomly distributed but are instead strategically invested in productive "Growth Poles" within the "Red and Orange Zones" (areas of economic deficit).

The key is that the intervention doesn't stop at the distribution stage. This system monitors the return on investment (both social and financial) generated by these productive assets whether agricultural equipment in a rural sub district or sewing machines for an embroidery industry on the outskirts of town. The resulting profits are not extracted outside the region, but are instead reinvested (re-injected) to expand business capacity or cross subsidize new empowerment clusters in neighboring red zones. This mechanism creates a virtuous cycle, where a single unit of ZISWAF currency circulates multiple times within the local ecosystem, creating added value with each cycle before finally being consumed. This

aligns with Hirschman's concept of forward linkages, where investment in one sector drives growth in others, creating a resilient regional economy that is less vulnerable to external shocks. A critical metric for the long-term success of UMMAT-EcoMap is the rate of socio-economic graduation. The system facilitates a structured transition for beneficiaries, guiding them through distinct phases of empowerment.

Rescue phase (red zone), interventions focus on meeting basic needs to stabilize household conditions. Recovery phase (orange zone), introduction of productive assets guided by the Geo-Economic Potential map. Resilience phase (yellow zone), strengthening market access and capital accumulation. Contribution phase (green zone), the final transformation where the former *Mustahik* becomes the new *Muzakki*.

The Impact Tracking feature in UMMAT-EcoMap provides the longitudinal data needed to monitor this graduation process. Unlike sporadic manual surveys, the digital platform offers real-time visualization of households "migrating" across color zones. This granular data allows Amil institutions to dynamically adjust interventions, for example, shifting from grant-based assistance to *Qardh al-Hasan* (benevolent loan) or *Mudharabah* (profit-sharing) schemes as recipients' economic capacities mature. Consequently, the dependency syndrome often associated with perpetual charitable aid can be systematically broken and replaced by a culture of dignified self-reliance. In the information age, public trust is the primary currency of philanthropy. The decline in trust in humanitarian organizations often stems from the black box nature of fund management. UMMAT-EcoMap transforms this with a "glass box" architecture. Through a public dashboard, donors can verify not only the receipt of funds but also the outcomes of their contributions. They can visually track how their *zakat* contributes to the shrinking of specific "Red Zones" on the map throughout the fiscal year.

This evidence-based reporting is projected to have a profound psychological impact on donor behavior. When *Muzakki* (*zakat donors*) can see statistical evidence of social transformation, represented by a quantitative reduction in poverty clusters, their propensity to contribute will increase. This positive feedback loop creates a sustainable funding stream for BAZNAS and LAZ, reducing donation volatility. Furthermore, the transparency mechanism acts as a robust internal control system, minimizing the risk of moral hazard or management irregularities by *Amil* administrators, thereby ensuring strict adherence to Sharia governance principles.

Finally, the successful implementation of UMMAT-EcoMap in Tasikmalaya has strategic implications for national policy. Tasikmalaya, with its unique demographic as a "City of Islamic Students" yet facing the paradox of structural poverty, represents a microcosm of the broader Indonesian landscape. The methodology developed in this study integrates Hirschman's Unbalanced Growth Theory with GIS-based ZISWAF distribution, providing a scalable and replicable blueprint (Mathenge et al., 2022).

If proven successful in the long term, this model could be adopted by the National Zakat Agency (BAZNAS) as a standard protocol for regional poverty alleviation. The transition from intuitive, proposal-based distribution to spatial data-driven interventions represents the future of Islamic economic development. By treating poverty not as a static, uniform figure, but as a dynamic spatial phenomenon, Indonesia can optimize its massive potential for Islamic philanthropy to achieve the Sustainable Development Goals (SDGs), particularly in poverty alleviation and inequality reduction, starting with the local wisdom of Tasikmalaya.

4. Conclusions

This study concludes that the persistence of the poverty paradox in Tasikmalaya, despite its status as a "Waqf City" with significant ZISWAF accumulation, is structurally rooted in the lack of spatial intelligence in philanthropic distribution mechanisms. Conventional "charity-based" approaches operating without precise geolocation data have

resulted in high levels of inclusion and exclusion errors, thus failing to address the root causes of economic deprivation.

UMMAT-EcoMap is a strategic corrective tool designed to bridge this gap. By synergizing Geographic Information System (GIS) technology with Hirschman's Unbalanced Growth Theory, this platform offers a new approach to Islamic economic development. This study confirms that the identification of "Growth Poles" (such as the embroidery industry in Kawalu and agrotourism in the district) and capital injection based on spatial data significantly improve the allocative efficiency of ZISWAF funds. The projected mathematical model $W = \int (Z \cdot e) + \Delta L$ validates that the incorporation of spatial efficiency (e) and industrial linkages Δ L able to accelerate welfare improvements far beyond the linear distribution method.

The comprehensive implications of this research lie in the establishment of a Sharia Circular Economy. UMMAT-EcoMap facilitates systemic transformation as follows. Governance encourages quadruple helix collaboration, integrating government poverty data (DTKS) with real-time field verification, thus acting as a fiscal partner for the APBD. Social mobility, shifting the trajectory of beneficiaries from dependency to socio-economic graduation, transforming *Mustahik* into new *Muzakki* through asset-based empowerment Public trust, replacing the “black box” of fund management with a transparent “glass box” architecture, increasing donor trust through evidence-based impact reporting. Limitations and Future Research This research is currently limited to a conceptual framework and prototype design based on secondary data analysis. Therefore, future research directions are suggested to focus on the technical development of the software (Beta Testing) and the implementation of a pilot project in one specific sub-district in Tasikmalaya. This step is necessary to empirically validate the spatial algorithm and measure the actual Social Return on Investment (SROI) post-implementation. Ultimately, UMMAT-EcoMap is recommended as a scalable blueprint for the digitalization of national Islamic philanthropy, supporting the achievement of SDGs points 1 and 10 in Indonesia.

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Author Contributions
N.R., and M.R.R., as 4th-semester Sharia Economics students, contributed equally to the development of this manuscript: N.R., responsible for establishing the background context regarding the challenges of conventional ZISWAF distribution and stating the study’s objectives. She conducted the literature review on the Maqashid Sharia concept as the ethical foundation for GIS technology integration, formulated the conclusion, and identified the novelty of this research. M.R.R., fully responsible for the methodology, describing the literature review procedures and secondary data collection techniques. He led the analysis of the theoretical components of GIS, explained the relationship between technology’s effectiveness and the field results of ZISWAF management, and ensured the manuscript met the technical standards for journal publication.

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Conflicts of Interest
The authors declare no conflict of interest.

Declaration of Generative AI Use
During the preparation of this work, the authors used Grammarly to assist in improving grammar, clarity, and academic tone of the manuscript. After using this tool, the authors reviewed and edited the content as needed and took full responsibility for the content of the publication.

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