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Development of a GIS-Based Socio-Spatial Quality Index for Assessing Urban Resettlement Outcomes: A Case Study of Quezon City

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Abstract

Urban relocation programs in Metro Manila have aimed to improve the living conditions of Informal Settlement Families (ISFs), yet many resettled communities continue to return to the city, which reveals persistent misalignments between relocation outcomes and actual needs. While previous studies have assessed socioeconomic aspects of resettlement, the spatial dimension of quality of life remains underexplored. This study addresses this gap by developing a GIS-based Socio-Spatial Quality (SSQ) index that integrates 26 indicators across socio-economic, geographic, and safety indicators using the Analytic Hierarchy Process (AHP) with inputs from both government housing authorities (National Housing Authority) and resettled communities across 10 relocation sites. The index developed was validated through ground-truth comparisons, with accuracy above 90%, confirming its high reliability. Results show that relocation sites have significantly lower SSQ scores (mean = ~0.41) than original settlements (mean = ~0.48), with a mean percent decrease of SSQ of -14.51, confirmed by computed local spatial Gini coefficients. Findings reveal that relocation to distant, off-city areas results in generally lower SSQ, with a moderate negative correlation between relocation distance and SSQ change (r = ~ –0.66), and significant differences arising from the varying prioritization of indicators between the two perspectives. Both institutional and resident perspectives consistently reflect these inequalities, though notable perception gaps remain in how each group views quality of life and relocation outcomes. The SSQ Index provides a replicable, participatory tool for evaluating urban resettlement and supports spatially just, evidence-informed planning interventions.

1. Introduction

Urban population growth stems from limited rural job opportunities and unequal regional investment, driving migration to cities and reinforcing uneven development (Gilles, 2012; Galace, 2023). This migration reveals deeper flaws in urban planning and housing policies, which fail to ensure equitable access to housing. Many informal settlers in Metro Manila have lived there since childhood, reflecting long-standing policy failures (Singh & Gadgil, 2017). Rising demand meets a shortage of affordable housing, worsened by high land costs and supply constraints that limit options for low-income residents (Ballesteros, 2002).

The NCR's 2023–2028 development plan promotes inclusive, resilient, and livable communities (MMDA, 2024). Aligned with this, resettlement initiatives aim to provide housing for the urban poor, driven by environmental and social goals, but often result in deprivation and community displacement.

The 5-year Housing Program (2011–2016), led by the DILG and NHA, sought to provide safe, affordable homes for ISFs in danger zones through in-city and off-city resettlement (Memorandum Order No. 57, S. 2013 | GOVPH, 2013). However, the program was criticized for lacking job opportunities and basic services, leading some families to sell their units and return to the city (Ballesteros & Egana, 2012). This underscores a gap in evaluation frameworks: while socio-economic studies examine urban and resettled communities, they often overlook spatial dimensions such as infrastructure accessibility, connectivity, and amenity placement. Addressing this requires a socio-spatial lens, as inequality reflects uneven distribution of opportunities across space, shaped by broader social disparities (Han, 2022).

Thus, there is a critical need for a spatially-informed approach that considers both planners' standards and communities' lived experiences. This study addresses that gap by developing a Socio-Spatial Quality Index using GIS and AHP to evaluate and compare original settlements and resettlement sites.

To address the identified gaps in evaluating urban resettlement, this study seeks to quantitatively assess and compare socio-spatial inequalities between original settlement areas and resettlement sites. This index ultimately seeks to provide a robust, evidence-based tool for evaluating relocation plans and guiding future resettlement programs toward more equitable and community-centered outcomes. Specifically, it aims to:

1. Develop Socio-Spatial Quality (SSQ) index to assess living conditions of different geographic locations based on Living Standards Measurement (LSM) framework through geospatial analysis techniques;
2. Evaluate disparities in socio-spatial quality between the original settlement and resettlement sites using the Socio-Spatial Quality (SSQ) index;
3. Identify the gaps between the socio-spatial perceptions of resettled communities and the planning assumptions of housing authorities and urban planners.

Designing human-centered socialized housing that considers family rights and socio-economic factors remains a challenge (Gilles, 2012). Aligned with UN SDG 11, this study uses the SSQ Index to assess pre- and post-relocation conditions, showing how socio-spatial factors shape quality of life. The index offers planners a practical tool to improve resettlement programs and advance spatial justice.

This study focuses on assessing socio-spatial inequality between original informal settlements in Quezon City and government-designated relocation sites in Caloocan, Rizal, and

Bulacan, and is analyzed at the barangay-level data spatial unit. The analysis also compares perceptions of two key stakeholders—the National Housing Authority (NHA) and resettled residents—to explore how differing views shape lived experiences and satisfaction. While data harmonization was applied, limitations remain due to differences in data formats, spatial resolution, and time coverage, possibly introducing minor biases. The SSQ reflects a temporal snapshot rather than a long-term assessment. Intangible factors like emotional attachment and cultural identity are only partially captured. Given the localized data and weighting schemes, SSQ values are context-specific and suitable only for internal comparisons, not for use across different studies or locations.

2. Methods

2.1 Study Area

This study examines two primary areas: the original informal settlements in Quezon City and the designated relocation sites where informal settler families (ISFs) were transferred under government-led housing programs. This comparative approach enables the evaluation of socio-spatial changes resulting from the relocation process. Figure 1 shows the distribution of the study areas.

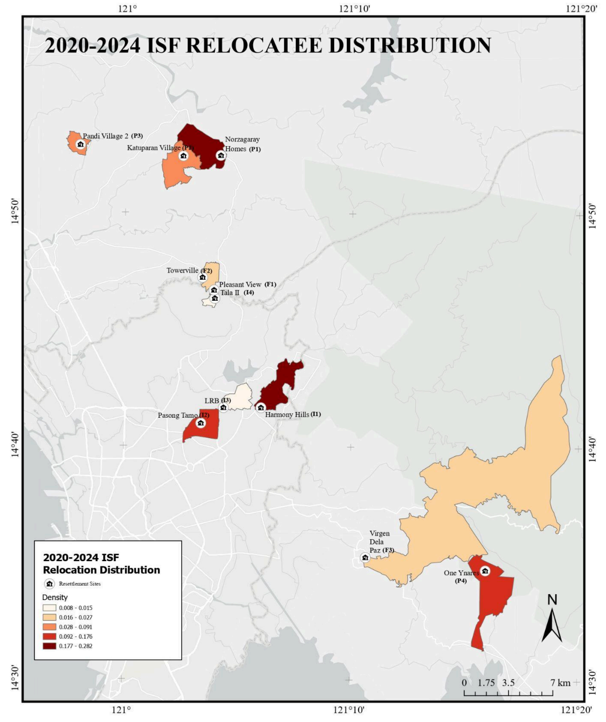

Figure 1. Map of the Resettlement Sites Location with an overlay of Relocated Families Distribution from NHA (2024)

Quezon City, the most populous and geographically extensive city in Metro Manila, recorded 3,177,435 residents as of the 2015 census (Philippine Statistics Authority, 2015). It covers approximately 161.13 square kilometers, accounting for around 25% of Metro Manila's total area. An estimated 195,875 families reside in informal settlements within Quezon City, many of whom occupy flood-prone and geologically hazardous areas (ICLEI – Local Governments for Sustainability, n.d.). To address the risks faced by these communities, the National Housing Authority (NHA) launched relocation initiatives from 2020 to 2024, targeting ISFs living in high-risk areas in Quezon City (refer to Table 2). These efforts led to the transfer of 2,251 families to various sites, including in-city relocations within Quezon City, near-city resettlements in Caloocan, and off-city sites in Bulacan (San Jose del Monte, Pandi, Norzagaray) and Rizal (Baras, Antipolo).

By examining both the original settlements and the resettlement areas, this study evaluates how these relocation strategies have reshaped the spatial and social dimensions of ISF communities.

Code	Group	Description
I	Core Cities	Cities within Metro Manila
F	Fringe Areas	Municipalities/Cities bordering Metro Manila
P	Periphery	Municipalities or cities in peripheral or provincial locations

Table 1. Spatial Grouping Across the Study Area

The study area was categorized into three spatial groups: Core Cities, Fringe, and Periphery, as shown in Table 1. Based on this, relocation projects were grouped as follows: core cities (I1–I4), fringe areas (F1–F3), and peripheral areas (P1–P4). This classification supports the analysis of socio-spatial variations across different urban proximities.

Spatial Group	Group	Original Settlements (Quezon City Barangays)
I1	Harmony Hills Phase 1	Batasan Hills, Commonwealth. Payatas
I2	Pasong Tamo Housing Project	Bagong Pag-asa
I3	LRB Republic Residences	Bagong Pag-asa
I4	Tala II Residences (LRB)	Batasan Hills
F1	Pleasant View	Bagong Pag-asa, Central, Dona Imelda
F2	Towerville Phase 6	Bagong Pag-asa
F3	Virgen Dela Paz Housing Project	Kaunlatan, Quirino 2A
P1	Norzagaray Homes	Bagong Pag-asa
P2	Katuparan Village Phase 2	Batasan Hills, Holy Spirit, Matandang Balara, Pansol, Sauyo
P3	Pandi Village 2	Bagong Pag-asa, Bagong Silangan, Kamuning, Matandang Balara, North Fairview, Pinyahan, Santo Domingo, Sta. Monica
P4	One Ynares Village	Bagumbayan, Dona Imelda

Table 2. Original Settlements and Relocation Area.

2.2 Research Design

Figure 2 shows the study's methodological workflow in three phases: (1) indicator preparation, (2) SSQ index development, and (3) SSQ scoring and quality distribution analysis.

The study's indicators are organized into three main dimensions: socioeconomic, geographic, and safety and security. Socioeconomic factors include household income, housing affordability, population, household crowding, employment, and the education of the household head. Geographic indicators cover land use, zoning, transport access, road connectivity, and infrastructure such as electricity, water, sanitation, media, and proximity to schools, health facilities, commercial centers, employment hubs, and the city center. Safety and security indicators capture hazard exposure (floods,

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earthquakes), crime rate, air pollution, and access to parks and playgrounds.

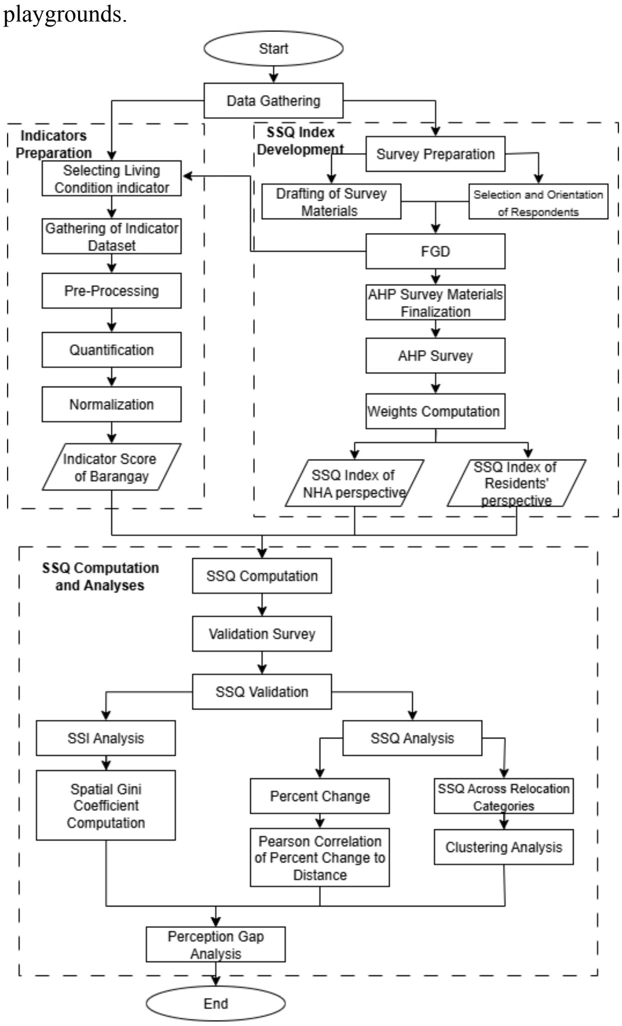

Figure 2. Workflow showing three methodology clusters: indicator preparation, index development, and analysis

These indicators were developed from four key sources: the World Bank's LSM Study as the core framework, the OECD Better Life Index for international validation, Ferrer's (2020) study for the Philippine relocation context, and Focus Group Discussions (FGDs) for local grounding. The LSM framework, using Household, Community, Price, and Special Facility Questionnaires, offered a multidimensional, globally recognized approach to assess living standards. The OECD framework added well-being dimensions such as income, health, education, and environment. Ferrer's study and human rights standards emphasized adequacy, security, and justice in housing. FGDs ensured the indicators reflected site-specific realities. Figure 2 lists all indicators. This study groups its indicators into three main categories: (1) socioeconomic, (2) geographic, and (3) safety and security. Socioeconomic indicators include income, housing affordability, employment rate, population size, household crowding, and educational attainment. Geographic indicators cover land use, zoning, transport access, infrastructure, and proximity to key services. Safety and security indicators assess hazard exposure (floods, earthquakes), crime rates, air pollution, and access to green spaces. As shown in Figure 2, these indicators follow a three-tier hierarchy: broad categories (Tier 1), clustered subcategories (Tier 2), and specific, measurable indicators (Tier 3), allowing for structured and detailed analysis.

2.3 Data Acquisition and Indicator Preparation

The analysis was conducted at the barangay level, covering both original settlements and relocation areas using secondary data from various government agencies and open-access platforms. Sources included PHIVOLCS, LGUs, PSA, MGB, PNP, Project NOAH, OpenStreetMap, ESRI Sentinel-2, and Google Earth Engine. To maintain temporal consistency, only data from 2020 to 2025 were used, prioritizing the most recent and relevant datasets. The datasets were digitized, encoded, and converted into shapefiles to ensure consistency and readiness for GIS processing. Manual data cleaning followed, aligning the datasets with FGD results and localizing them to reflect the specific context of relocation.

2.3.1 Survey Methodologies: This study used two primary survey methodologies: (1) Focus Group Discussions (FGDs) and (2) the Analytic Hierarchy Process (AHP) survey. FGDs were conducted with experts from the National Housing Authority (NHA) and community representatives to gather qualitative insights into the living conditions and priorities of relocated households. Discussions followed a structured questionnaire to identify and validate key socio-spatial indicators. The AHP survey then quantified the importance of these indicators through pairwise comparisons, involving the same NHA experts and 90 randomly selected community members across 10 relocation sites. The sample size for the AHP survey was determined using Cochran's formula for large populations:

$$n_0 = \frac{Z^2 p(1-p)}{E^2} \tag{1}$$

where n_0 = initial sample size (population of 2,251 ISFs)
Z = z-value (1.96) with 95% confidence level
p = estimated population proportion (0.5)
E = margin of error (10%).

2.3.2 Socioeconomic Indicators: Socioeconomic indicators included financial wellness, employment status, and educational attainment, and were sourced mainly from PSA and LGUs. Financial wellness was assessed using occupation-based income classes, with weighted averages normalized across barangays. Other indicators, such as affordable housing, household crowding, and employment rate, were derived from census data and adjusted to the barangay level. Educational attainment was weighted by years of schooling and normalized for comparability.

2.3.3 Geographic Indicators: The geographic indicators in this study were grouped into three subcategories: (1) location, (2) movement, and (3) infrastructure.

For local dimension, Land Use/Land Cover (LULC) and zoning data were examined. LULC data from the ESRI Sentinel-2 Land Cover Explorer (2020–2025) and LGU Zoning maps were processed and analyzed. To quantify it, land use and zoning diversity per barangay were computed using the Entropy Index (Voukenas, 2024).

$$Entropy = -\sum_{i=1}^{k} \frac{P_i \times ln(P_i)}{ln(k)} \tag{2}$$

where Pi = proportion of land use type i in the area
k = total number of distinct land use types.

Movement indicators captured public transport access and road network connectivity. Public transport accessibility was measured by calculating the proportions of each barangay within a 500-meter buffer of city or municipal halls. Road network connectivity was assessed using Kansky's Beta index (β) and Rodrigue's Eta index (η), combined into a Mobility Index (Ducruet, n.d.):

$$\text{Mobility Index} = \beta/\eta \quad (3)$$

where β = Kansky's Beta index
η = Rodrigue's Eta index

Infrastructure indicators reflected access to essential services, including electricity, water, sanitation, communication media, and proximity to key facilities such as schools and hospitals. Access metrics were expressed as percentages of total households, while proximity scores were calculated using Voronoi diagrams and spatial buffers.

$$AoE = (\frac{e}{n}) \times 100 \quad (4)$$

$$AoW = \frac{f}{n} \times 100 \quad (5)$$

$$AoS = [x * [(\frac{p}{n}) + (\frac{w}{n})] \times 100] \div 2 \quad (6)$$

where n = total number of households in the barangay,
x = refers to the barangay population.
e = frequency of households with electricity
f = represents households with an own-use faucet,
g = households whose garbage is regularly collected
w = households with an exclusive water supply.

2.4 Formulation and Computation of Socio-Spatial Quality Index

The Socio-Spatial Quality (SSQ) Index is a composite measure structured into categories, subcategories, and indicators, weighted using AHP-derived values obtained from the survey responses. All indicator scores were normalized using min-max scaling to standardize values between 0 and 1. Using the geometric mean method, pairwise comparison matrices were constructed and refined over four cycles until weights stabilized with a Consistency Ratio (CR) ≤ 0.1 accepted. Final SSQ scores were computed by multiplying the normalized indicator values with their weights and summing them per barangay. SSQ scores range between 0 (low quality) and 1 (high quality), indicating relative living condition quality.

2.5 SSQ Validation

A total of 10 responses were collected from each community, wherein respondents evaluated their experienced living conditions using a Likert scale. These perception-based scores were treated as the observed values for ground-truthing. To allow direct comparison, the survey results were standardized and made comparable to the computed values of the indices, which represented the predicted living conditions. The Root Mean Square Error (RMSE) was then employed to determine the variation between the computed living scores from the indices and the experienced living conditions derived from the Likert scale. Lower RMSE values were interpreted as indicating closer alignment between predicted and observed scores, thereby reflecting stronger reliability of the indices in representing actual community living conditions.

2.6 Statistical and Spatial Analysis of SSQ Patterns

To explore spatial patterns and disparities in the Socio-Spatial Quality (SSQ) Index, several analytical techniques were applied. K-Means clustering was used to classify barangays into five clusters, ranging from very high to very low SSQ values. This method solely relies on the index score without considering location, thereby highlighting natural groupings of socio-spatial conditions. The clusters facilitate comparison of spatial disparities and are visualized via choropleth maps. To assess geographic clustering of SSQ values, spatial autocorrelation analysis was conducted using a K-nearest neighbor (KNN) approach. Global Moran's I was used to test overall spatial patterns, while Local Moran's I (LISA) was applied to detect localized clusters or outliers. A statistically significant positive Moran's I indicates spatial clustering of similar SSQ levels. To analyze how SSQ values vary by spatial context, relocation areas were grouped based on their proximity to Metro Manila: core cities, fringe municipalities, and peripheral locations. One-way ANOVA tests for significant SSQ differences among these groups, followed by Tukey's HSD post hoc tests to identify specific differences. Lastly, the perception gap between institutional planners and relocated residents was examined. Differences between planners' and residents' SSQ evaluations are measured by calculating the absolute differences and tested using paired t-tests for significance. Levene's test checks variance equality, validating whether perception gaps are statistically meaningful.

2.7 Analyzing Socio-Spatial Inequality from Relocation Outcomes

Socio-spatial inequality from relocation was examined by comparing SSQ scores between original settlements and relocation sites, measuring changes in quality, distance effects, and spatial concentration of disadvantage. SSQ change was computed as a percentage difference between matched origin and relocation sites. Results were visualized with thematic maps to identify inequality patterns and clusters and spatial trajectories across the study area. To evaluate whether the observed changes were statistically significant, paired t-tests were performed on SSQ values across both institutional and resident perspectives. A paired t-test compared SSQ means between original and relocated areas to determine if differences were statistically significant. Levene's test checked variance equality between perspectives. The influence of spatial displacement was analyzed by calculating Euclidean distances between the origin and relocation barangays. A Pearson correlation analysis was implemented to examine the relationship between relocation distance and SSQ change, revealing how physical distance affects socio-spatial outcomes. To measure the overall degree of inequality, a Spatial Gini Index was computed. Higher values indicate greater spatial clustering of inequality, while lower values suggest more equitable SSQ distribution.

3. Results and Discussion

The SSQ developed was analyzed across different dimensions: differences in perspectives between institutional planners and relocated residents, spatial variation and clustering of socio-spatial quality values across the study area, and the impacts of relocation outcomes, including changes in SSQ, perception gaps, and the influence of relocation distance. These analyses provided a comprehensive view of inequality by combining statistical, spatial, and stakeholder-informed approaches.

3.1 Socio-Spatial Quality Indicators and Socio-Spatial Quality Index

The development of the SSQ index was grounded in validated indicators reflecting both global frameworks and local realities. Indicators were based on the Living Standards Measurement and the Organisation for Economic Co-operation and Development frameworks and validated through focus group discussions with the institutional planners (NHA) and relocated residents. The institutional planners emphasized service access, safety, and tenure security but noted some indicators felt “idealistic” due to resource limits. Relocated communities validated all indicators, stressing unmet needs like utilities, transport, healthcare, jobs, and recreation. Merging global frameworks with local input ensured the indicators were both relevant and grounded for assessing resettlement quality of life. AHP-derived weights captured stakeholder priorities and revealed diverging emphases between institutional planners and residents. While both groups agreed on the importance of affordable housing and employment, experts emphasized safety and geographic factors, which are different from the priorities of residents, who prioritized socio-economic factors like financial security and jobs. This reflects differing perspectives between lived needs and technical planning. Despite individual variations, group-level consistency ratios (CR $\leq$ 0.10) confirmed the reliability of the weights. These findings highlight the gap between institutional standards and residents’ immediate concerns in resettlement areas.

Data	RMSE	Accuracy	RMSE	Accuracy
	Relocation		Origin	
NHA	0.097	90.313	0.094	90.611
Residents	0.091	90.872	0.094	90.602

Table 3. Root Mean Square Errors of the SSQ Values

Apart from the evaluation of the reliability of the weights incorporated in the development of the index, the SSQ index itself was validated by comparing its results with actual living conditions. As shown in Table 3, the SSQ index demonstrated strong validity and predictive accuracy, with RMSE below 0.1 and over 90% accuracy across all perspectives. The index reliably differentiated living conditions between original and relocated areas across both perspectives, affirming its robustness as a decision-support tool for policy and resettlement planning.

3.2 Spatial Variation and Clustering of Socio-Spatial Quality

Spatial analysis of SSQ categories revealed distinct differences in perceived living conditions across the study area. Using validated weights, scores for socio-economic, geographic, and safety factors were mapped to show disparities. In Table 4, the institution rated more areas favorably in socio-economic and geographic terms, reflecting development goals, while residents gave more conservative evaluations, emphasizing limited access to jobs, services, and infrastructure in relocation sites.

Despite these differences, both groups identified urban centers such as Quezon City as relatively suitable and consistently rated peripheral areas lower. For safety, residents viewed their environments more positively based on immediate conditions, whereas the institution applied broader risk-based criteria.

Factors	NHA	Residents
Socioeconomic	0.3030	0.3728
Geographic	0.3324	0.2946
Safety and Security	0.3647	0.3326

Table 4. AHP Weights of the General Categories

The composite SSQ index (Figure 3) further illustrated these disparities: higher values clustered in central urban areas (Quezon City, Caloocan, San Jose del Monte), while lower scores characterized peripheral municipalities (Norzagaray, Pandi, Baras) due to limited infrastructure and services. Both perspectives converged in identifying high- and low-performing areas, though with different justifications, underscoring the central role of urban proximity in shaping socio-spatial quality, consistent with central place theory. Figures 3 and 4 show communities closer to central urban areas like Quezon City and Caloocan have higher SSQ scores due to better infrastructure, public services, and socioeconomic opportunities. In contrast, peripheral municipalities such as Norzagaray, Pandi, and Baras score lower, reflecting limited infrastructure, weaker accessibility, fewer employment options, and greater safety risks.

Both perspectives highlight that remoteness negatively impacts geographic accessibility, housing quality, education, and security, lowering overall SSQ. Global Moran’s I confirmed significant positive spatial clustering of SSQ values from both perspectives. The Residents_SSQ dataset reports a Moran’s Index of 0.4916, while the NHA_SSQ dataset shows a slightly lower value of 0.4634.

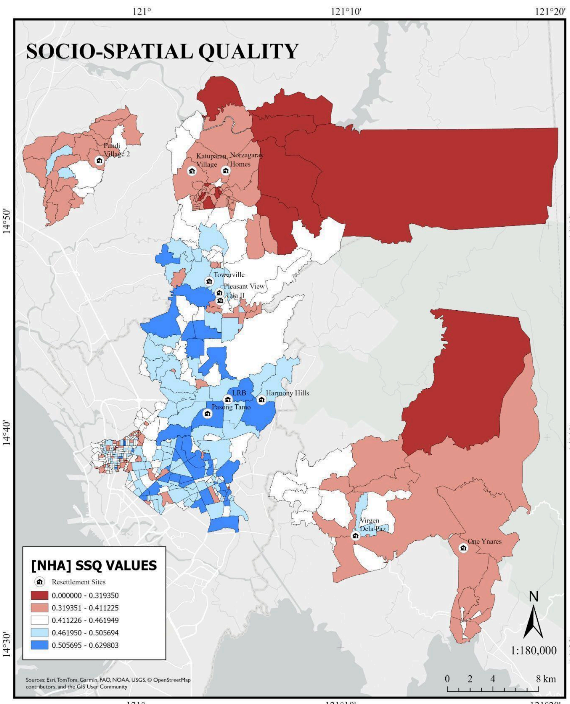

Figure 3. Composite Socio-Spatial Quality based on NHA Perspective

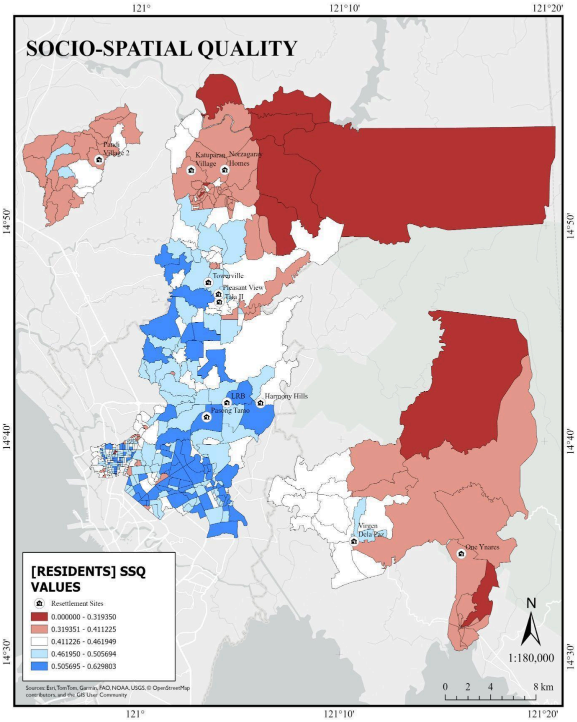

Figure 4. Composite Socio-Spatial Quality based on Residents' Perspective

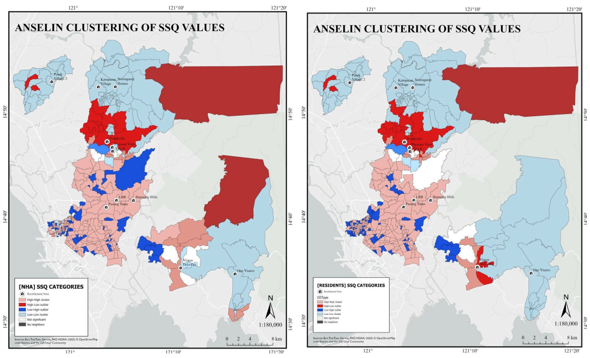

Figure 5. Spatial Autocorrelation of SSQ Values based on NHA's Perspective (left) and Residents' Perspective (right)

LISA analysis revealed localized hotspots and coldspots, with some discrepancies between institutional and resident perceptions, indicating different assessments of living conditions. Outliers highlighted areas needing focused attention due to mismatched institutional and resident views. Residents' SSQ data showed slightly stronger spatial autocorrelation, suggesting more pronounced spatial patterns in perceived quality of life. Figure 5 shows high-high SSQ clusters in central urban areas like Quezon City, Caloocan, and Antipolo, reflecting concentrated favorable living conditions. In contrast, low-low clusters appear in Norzagaray, Pandi, and Baras, while spatial outliers are mainly found in San Jose del Monte and Antipolo.

The computed mean SSQ values were 0.434 from the NHA perspective and 0.454 from the residents' perspective, with comparable medians of 0.438 and 0.460, respectively. The interquartile ranges were nearly identical (0.07362 for NHA and 0.07375 for residents), suggesting a relatively consistent spread of values across both perspectives. Notably, residents tended to rate their conditions slightly more positively, albeit within a narrow margin. Differences in SSQ arise mainly from how each group weights factors such as accessibility, safety, infrastructure, and social services. These differences point to a persistent perception gap, which points to deeper issues in participatory planning, where top-down approaches may fail to fully capture community needs and experiences.

3.3 Socio-Spatial Inequality Analysis from Relocation Outcomes

Spatial and statistical analyses of SSQ values between original and relocation sites revealed marked disparities in living conditions and highlighted the uneven outcomes of off-site resettlement.

Spatial Group	NHA	Residents
I	-0.039658	-0.047071
F	-0.106318	-0.099816
P	-0.178813	-0.170795

Table 5. Average Change in Living Conditions per Relocation Site by Spatial Group of both Perspectives

The percent difference in SSQ values between the perspectives of the NHA and the residents across relocation sites (Table 5) reveals a significant divergence in the perceived impact of relocation. While a few sites, such as Harmony Hills (F1) and Pasong Tamo (F2), are viewed positively, the majority exhibit negative changes, indicating a general decline in living conditions. Harmony Hills stands out for having no measurable change from either perspective. In contrast, areas like Norzagaray Homes (P1) and One Ynares (P3) experienced some of the most substantial declines, which may stem from challenges such as limited infrastructure, poor access to services, or disconnection from employment and social networks. A particularly notable case is Pasong Tamo, where the NHA assessed improvements while residents reported a decline, highlighting a disconnect between institutional evaluation methods and residents' lived experiences.

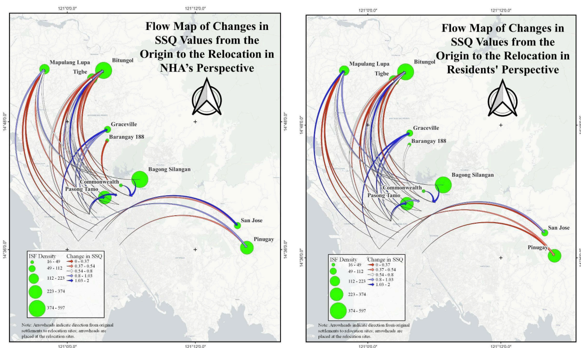

Figure 6. Flow Maps of Socio-Spatial Inequality

The flow maps in Figure 6 show how relocation impacted living conditions, mapping movements from original settlements to new barangays. These maps visually show that long-distance relocations, particularly to areas like Norzagaray and Baras, often result in declines, while shorter, in-city moves tend to maintain or improve SSQ. To quantify this relationship, Pearson correlation and linear regression were used to assess the effect of relocation distance from Metro Manila on changes in SSQ (ΔSSQ). A moderate negative relationship was found (NHA: –0.66; the residents = –0.61). These results confirm that greater relocation distances are linked to declining socio-spatial quality. This trend supports a key planning insight: proximity matters. On-site relocations, which involve minimal displacement, often preserve or even improve SSQ due to better infrastructure or tenure. In-city moves can result in moderate declines, while off-city relocations, peri-urban or rural areas, show the steepest drops in SSQ.

ANOVA and Tukey HSD results further validate this trend. Both NHA and residents' data showed statistically significant differences in SSQ scores among zones. Metro Manila had significantly higher SSQ scores than the Fringe and Periphery, while the Fringe and Periphery did not differ significantly from each other. This confirms spatial inequality linked to distance from the urban core, with urban core areas offering better socio-spatial conditions than more distant locations. Specifically, from the NHA's perspective, there were statistically significant differences in SSQ values across all three spatial categories, Core, Fringe, and Periphery/Provincial, suggesting a gradient of decline with increasing distance. In contrast, residents' assessments revealed significant differences only between Metro Manila and the other two categories (fringe and periphery), with no significant difference between fringe and peripheral sites. This suggests a threshold effect: once relocated beyond a certain distance, further marginalization may no longer meaningfully differentiate perceived quality of life, reflecting a shared experience of spatial and social exclusion. To further examine inequality patterns, Global and local spatial Gini coefficients were calculated from SSQs derived from both perspectives. The global Gini values were extremely low (~0.0001), suggesting an overall even distribution of living conditions across the region. However, this broad measure masks significant localized disparities because averaging dilutes intra-municipal differences. To capture these hidden inequalities, local spatial Gini coefficients were computed for individual municipalities, revealing finer-scale variations in socio-spatial advantage and deprivation that global metrics overlook.

Baras, Norzagaray, Antipolo City, and Pandi exhibited intra-municipal Gini values over 50 times higher than others, pointing to pockets of socio-spatial deprivation amid more advantaged areas. This means parts of these municipalities enjoy much better living conditions, while others remain underserved. The close agreement between NHA and residents' assessments adds credibility to these findings. In contrast, highly urbanized cities like Quezon City and Caloocan show very low local Gini values, reflecting more even socio-spatial conditions. Figures 7 and 8 confirms this center–periphery gradient, where socio-spatial inequality intensifies with distance from Metro Manila's urban core. This underscores the spatial fragmentation experienced in more peripheral relocation areas. Earlier results revealed differing priorities between the NHA and relocated residents in defining quality of life. Yet despite these differing criteria, both groups ultimately arrived at a shared assessment of relocation outcomes. Both the NHA and resettled residents agree that SSQ declines after relocation, as indicated by similarly negative mean SSQ scores (NHA: –0.1423; residents: –0.1478). An independent sample t-test showed no statistically significant difference between their perceptions. This convergence points to a mutual recognition of socio-spatial decline following relocation, regardless of how quality of life is defined. It reinforces the broader inequality findings: relocation often leads to deteriorated living conditions, and both institutional and lived perspectives acknowledge this outcome. While institutional actors are aware of these challenges, a comprehensive framework to address residents' transitional hardships is still lacking.

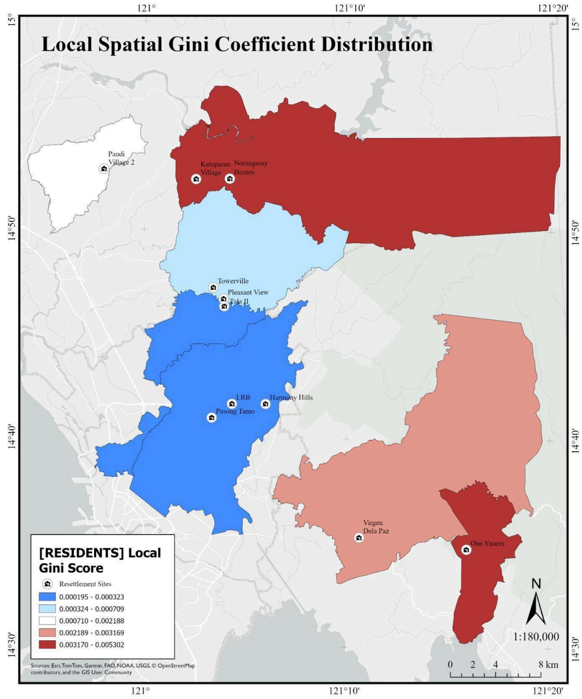

Figure 7. Local Spatial Gini Distribution based on NHA's Perspective

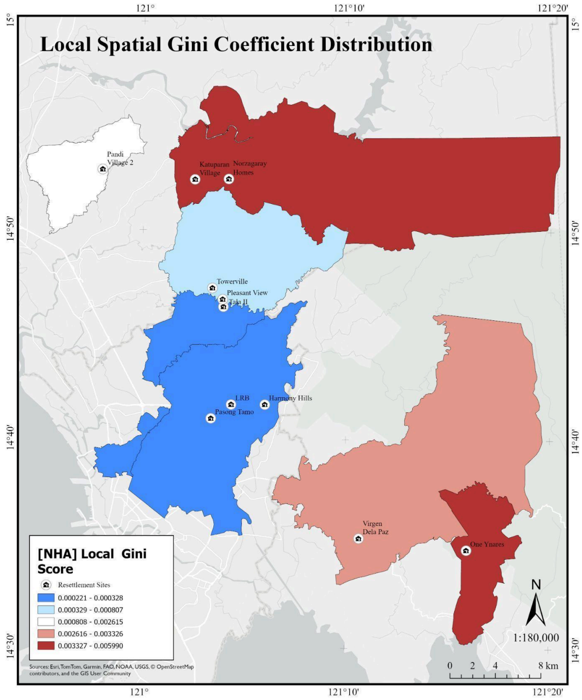

Figure 8. Local Spatial Gini Distribution based on Residents' Perspective

3.4 Implications for Resettlement Planning and Socio-Spatial Justice

This study highlights the gap between housing authorities' priorities, legal compliance, and safety, and residents' needs for proximity to work, services, and social networks. Such misalignment drives disparities in socio-spatial quality, worsened by distance from urban cores, weak infrastructure, and limited job access. Peripheral relocations often isolate communities, causing underemployment, fragile support systems, and stigma, with early relocatees facing the harshest conditions. Spatial analysis identified low-quality clusters in Baras, Norzagaray, and Pandi, underscoring the need for localized solutions over blanket policies. The SSQ index developed here offers a tool to guide such assessments. Resettlement must pursue socio-spatial justice, ensuring not just safety, but also access, opportunity, and community reintegration.

4. Conclusions

This study assessed disparities in living conditions between original settlements and relocation areas using a Socio-Spatial Quality (SSQ) index that reflects both resident and institutional perspectives. Built on the Living Standards Measurement framework and validated through AHP and FGDs, the SSQ index showed high reliability. Results revealed significant socio-spatial gaps, with relocation sites, especially those farther from original communities, having lower SSQ scores due to reduced access to services and urban amenities. The divergence in priorities is telling: while the NHA upholds regulatory compliance, safety, and environmental suitability, relocated residents highlight the daily realities of economic insecurity, social isolation, and service deprivation. Yet, despite their differing lenses, both perspectives converge on a stark conclusion: relocation, as currently implemented, often results in a net decline in quality of life. Thus, the study affirms the utility of the SSQ index as a diagnostic tool for revealing place-based disparities and guiding evidence-informed interventions to adopt more inclusive, context-sensitive approaches grounded in spatial justice. Incorporating socio-spatial justice as a guiding principle, future planning must adopt more inclusive, context-sensitive approaches that account for both institutional objectives and community needs to ensure that resettlement leads not only to physical relocation but to improved and equitable living conditions.

Future research should test the SSQ index in varied contexts (rural resettlements, post-disaster relocations, in-city redevelopment) and through longitudinal studies to track long-term impacts. Larger samples and broader economic indicators (GDP, GNP, poverty indices) can strengthen analysis. Integrating community and institutional perspectives is vital for inclusive strategies, while policies must prioritize secure tenure, affordable housing, sustainable livelihoods, and context-sensitive infrastructure. Continuous community engagement and feedback mechanisms are essential to ensure equitable and lasting resettlement outcomes.

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