

URBAN LEFTOVER SPACES AND MEASURED SUBJECTIVE WELL-BEING OF ADJACENT RESIDENTIAL COMMUNITIES

Insights from Ratmalana Railway landscapes, Sri Lanka

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Abstract: This study addresses the absence of an adequate framework for assessing how urban leftover railway spaces influence the subjective well-being of adjacent residential communities. An analytical framework was developed by integrating theories of Urban Decay, Terrain Vague, and Social Disorganization. The research conceptualized six key dimensions related to the impacts of urban leftover spaces and seven subjective well-being domains. A mixed-methods approach was employed, combining spatial observations with a pilot-level survey of fifty residents selected from adjacent residential communities in Ratmalana. Data were collected using an author-designed questionnaire alongside the Personal Well-Being Index for adults, adapted to the local socio-spatial context. Results indicate that visual blight was the most significant factor of dissatisfaction associated with urban leftover spaces, while future security recorded the lowest well-being score among all domains. The overall well-being level of the community was classified as “challenged”, with a total score of 36%. The findings demonstrate the potential of the proposed framework as a preliminary assessment tool for quantifying the impacts of urban leftover spaces. The study provides an initial evidence base for understanding the relationship between railway-related urban leftover spaces and community well-being, offering a foundation for future comparative and longitudinal research across diverse urban contexts.

Keywords: Sri Lanka; Subjective Well Being (SWB); Terrain Vague; Urban Decay; Urban Leftover Spaces (ULS).

1. Introduction

Urban leftover spaces (ULS) are “in-between” areas that emerge from physical and social discontinuities within the urban fabric (Loukaitou-Sideris, 1996). These spaces are often deteriorated and create divisions between built environments and communities, which are conceptualized as ‘cracks’ in the cities (Loukaitou-Sideris, 1996). ULS are commonly addressed as transitional spaces within the urban fabric, held in anticipation of future planning and development interventions (Kim et al., 2018). In many urban contexts, they remain vacant, or underutilized for extended periods, either temporarily or permanently, depending on planning priorities and economic conditions (Green & Denipitiya, 2023). These spaces therefore represent both spatial uncertainty and planning incompleteness within rapidly changing urban environments.

ULS contribute to increased crime, deteriorating infrastructure, and social fragmentation, including process of gentrification (Mah, 2012; Rink & Arndt, 2016). Studies have shown that those spaces increase psychological distress, fear, discomfort including tension and depression (Evans, 2003; Korpela et al., 2008). Despite these challenges, ULS also hold potential for regeneration and can contribute to more sustainable urban living if appropriately designed and managed. In contemporary urban planning discourse, landscape architects and urban designers play a critical role in transforming degraded urban spaces into meaningful public environments that enhance Subjective Well-Being (SWB) (Nordh & Evensen, 2022). SWB refers to an individual’s cognitive and emotional evaluation of life experiences, while Quality of

Life (QOL) represents a broader construct incorporating both subjective perceptions and objective living conditions (Das et al., 2020). However, empirical research on the relationship between ULS, SWB, and QOL remains limited in the Sri Lankan context, particularly in rapidly urbanizing suburban areas.

Railway-adjacent ULS in Ratmalana are embedded within dense residential neighbourhoods, exposing nearby communities to environmental degradation and visual blight associated with spatial neglect. This highlights a significant contextual gap in understanding how such environments influence both psychological and SWB outcomes. Accordingly, this study examines the associations between ULS and multiple dimensions of SWB and QOL, providing evidence for context-specific urban regeneration strategies in Sri Lanka.

The research question (RQ) guiding this study was ‘How do ULS influence SWB and QOL among residents living in adjacent neighbourhoods?’

Research objectives (RO) are based on;

- RO 1- To define and contextualize ULS within the urban fabric.
- RO 2- To investigate the socio-spatial impacts of ULS on the SWB of adjacent residential communities.
- RO 3- To assess the relationship between key ULS impacts and SWB domains measured through the Personal Well-Being Index for adults (PWI-A).
- RO 4- To develop an evidence-based conceptual framework linking ULS impacts and SWB for use

in preliminary urban assessment and regeneration urban planning.

Accordingly, the following sections present the methodological approach and conceptual framework adopted to address these ROs and examine the relationship between ULS, SWB, and QOL in the selected study context.

2. Literature Review

This section reviews the conceptual background of ULS, their socio-spatial impacts, and their relationship with SWB and QOL. It also examines participatory approaches for transforming ULS into more inclusive environments.

2.1. DEFINING ULS

Urban growth is a non-uniform process influenced by governance structures, financial capacity, planning frameworks, physical geography, infrastructure development, and socio-cultural conditions (Turok & McGranahan, 2013). Trancik (1986) defines ULS as “lost spaces,” referring to ill-defined, underutilized urban areas with weak visual and functional identity. These spaces are frequently associated with uneven urban growth patterns and are often generated through fragmented planning and zoning practices (Trancik, 1986).

These spaces typically lack clear boundaries and are found adjacent to infrastructure such as highways, railways, or planned developments, where they remain functionally ambiguous or reserved for future use within the urban fabric. In the literature, these conditions are not defined under a single unified concept but are instead referred to through multiple overlapping terms. These diverse interpretations can be broadly organized into macro and micro spatial scales, as summarized in Table 1.

Table 1: Macro and Micro Scale conceptualization of ULS
(Source: (Azhar, 2019))

Scale	Terms Used in Literature	Key Interpretation
Macro Scale (City / System Level)	Residuals Space; Temporarily Obsolete Abandoned Derelict Sites; Brownfield Land; Terrain Vague; Vacant Land; Superfluous Landscape; Uncertainty and Margins; Pause Spaces	Large-scale urban or post-industrial spaces formed through structural urban change, planning gaps, and socio-economic transformation. These spaces represent systemic urban discontinuities and broader territorial abandonment or underutilization.
Micro Scale (Neighb)	Personal Space & Territory; Liminal Space; Vacant	Small-scale interstitial or fragmented spaces

ourhood / Human Experience Level)	Parcel; Striated Space & Smooth Space; Interzone; Third Space; Cracks in the City; Non-Space; Dead Space; Slack Space; Loose Space; Indeterminate Space; Tight Space	experienced directly by users. These spaces reflect everyday spatial ambiguity, informal use, sensory perception, and micro-level urban fragmentation within active urban environments.
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Across both scales, ULS emerge through overlapping rural, urban, and infrastructural processes rather than a single factor. In Sri Lanka, studies conducted on Kirulapane, describe ULS as poorly maintained areas characterized by vacancy, unmanaged vegetation, accumulated waste, varying accessibility, informal use, and environmental degradation (Green & Denipitiya, 2023). Similarly, the findings from Soysapura, Dematagoda, and Slave Island (Church Street end) in Colombo highlight that spatial configuration, permeability, and lack of functional responsiveness are key drivers in the formation of ULS (Fernando & Suresh, 2016).

In urban and suburban contexts, ULS also include post-industrial and extractive landscapes such as quarries and underutilized industrial sites (Baczyńska et al., 2018). Infrastructure related ULS, particularly disused railway networks, stations, and associated facilities, represent another significant typology shaped by technological, economic, and social transformations (Oppido & Ragozino, 2014). Collectively, these typologies demonstrate that ULS emerge as a result of multiple overlapping processes across rural, urban, and infrastructural systems.

2.2. PSYCHOLOGICAL AND SOCIAL IMPACTS OF ULS

SWB refers to an individual's evaluation of their life through both affective (emotional) and cognitive (evaluative) dimensions (Das et al., 2020). ULS negatively influence the mental health of nearby communities, contributing to loneliness and depression (Korpela et al., 2008). Such environments often evoke depressive, fearful, and nostalgic emotional responses, reducing social trust and weakening perceptions of safety (Krupat, 1985; Sousa Matos, 2014). ULS contribute to directed attention fatigue, as degraded visual environments impede psychological recovery (Kaplan, 1995). These psychological impacts were caused by a decline in social networks and societal structures, both of which were necessary for SWB (Keyes, 1998). Evidence from Philadelphia shows that greening and restoring vacant land can reduce violent crime and fear while improving overall well-being (Branas et al., 2018).

Beyond individual psychological outcomes, ULS also generate significant social consequences. These spaces often limit opportunities for social interaction and contribute to processes of social exclusion and spatial

inequality (Armstrong, 2000). These processes indicate that ULS not only affect individual experiences but also reshape the spatial conditions under which social relationships and community interaction occur. In broader socio-economic contexts, increasing privatization and declining public investment intensify marginalization processes, weakening social cohesion and collective well-being (Adams et al., 2019; Piketty, 2015). Over time, such conditions contribute to reduced community stability and reinforce cycles of urban disadvantage (Sennett, 1998).

Empirical evidence suggests that interventions in ULS can produce positive outcomes. For example, the greening and rehabilitation of vacant land in Philadelphia has been shown to reduce fear and violent crime while improving perceived SWB among residents (Branas et al., 2018). This highlights the strong relationship between spatial quality and both psychological and social health outcomes. To systematically interpret these impacts, White (2009) proposes three interrelated dimensions of well-being: relational (social ties and participation), subjective (identity, belonging, and personal fulfilment), and material (access to basic needs such as housing, food, and healthcare). These dimensions provide a useful framework for interpreting how ULS influence well-being across both individual and community levels.

2.3 CO-DESIGN OF INCLUSIVE URBAN LANDSCAPES

Urban landscapes shaped through active community participation can help reduce social fragmentation and environmental neglect associated with ULS (Bullock et al., 2007). In this context, co-design is understood as a collaborative and participatory process in which researchers, practitioners, policymakers, and local stakeholders jointly develop knowledge, strategies, and interventions to address complex urban challenges (Webb et al., 2018). This approach supports a systems-based understanding of cities and promotes more integrated and context-responsive decision-making across multiple spatial scales.

By involving communities in the design process, ULS can be reinterpreted from areas associated with visual disorder and directed attention fatigue into restorative and adaptive landscapes that support psychological recovery (Kaplan, 1995). Practical applications of co-design include community gardening, adaptive reuse of vacant land, and the integration of green infrastructure within neglected urban areas. Those practical applications demonstrate how collaborative planning can activate underutilized spaces and reintegrate them into everyday urban life (Wakefield et al., 2007). Evidence suggests that when communities are actively engaged in shaping their surroundings, ULS can be transformed into inclusive and socially vibrant landscapes that strengthen community resilience and enhance SWB (Bullock et al., 2007). Overall, co-design provides a participatory framework through

which ULS can be reimagined as productive, inclusive, and socially supportive urban environments.

3. Theoretical framework

This section establishes the theoretical framework by linking ULS to theories of Urban Decay and Social Disorganization, and by further interpreting them through the concept of Terrain Vague. Together, these perspectives explain how physical negligence and social processes interact to shape community well-being and urban experience.

3.1. URBAN DECAY & SOCIAL DISORGANIZATION

ULS can be understood as spatial manifestations of broader socio-spatial decline within the urban fabric. From the perspective of Social Disorganization Theory, structurally disadvantaged or neglected urban environments are associated with weakened collective efficacy and reduced informal social control, which in turn diminish community cohesion and increase vulnerability to disorder (Sampson & Groves, 1989). In this sense, ULS contribute to the reinforcement of urban inequity by concentrating neglect and limiting opportunities for positive social interaction, particularly in marginalized urban areas (Haase et al., 2016). These dynamics are further shaped by uneven patterns of urban investment, where low-income communities often experience systemic exclusion from development processes (Quastel et al., 2012).

Urban decline is also shaped by planning and economic logics that prioritize efficiency and capital accumulation, leading to the withdrawal of investment from less profitable areas (Acioly, 1999). The physical deterioration of ULS can also be interpreted through the Broken Windows Theory (Kelling & Wilson, 1982), which suggests that visible signs of neglect may signal weak social control, reduce perceived safety, and discourage public use of space. Similarly, the Spirals of Decline Theory (Prak & Priemus, 1986) explains how physical deterioration and social disengagement reinforce one another over time. However, these interpretations are not deterministic, as neighbourhood outcomes are significantly mediated by levels of collective efficacy and social structure (Skogan, 2015). Collectively, these perspectives highlight that urban decay emerges from the interaction between physical neglect, social withdrawal, and structural inequality, ultimately contributing to reduced spatial justice and diminished SWB (Morrison, 2013).

While these theories emphasize processes of decline, ULS should also be understood as contested urban conditions with potential for transformation. Rather than being permanently degraded, such spaces may retain latent historical, cultural, or social value that can be reactivated through adaptive reuse and community engagement (Mah, 2012). ULS are not only outcomes of urban decay but also potential spaces for regeneration, where integrated planning approaches and active stakeholder engagement

can contribute to social cohesion and sustainable urban development. (Cilliers, 2016; Vanderstede, 2011). Beyond explanations of urban decay, ULS can also be understood through spatial-cultural perspectives such as Terrain Vague.

3.2. ULS AS TERRAIN VAGUE

ULS in cities can be understood through the concept of Terrain Vague, which describes underused, or indeterminate urban areas produced as residuals outcomes of urbanization and redevelopment. Continuous expansion and restructuring of cities generate fragmented and unplanned spaces that fall outside formal systems of use and control (Brenner & Schmid, 2011; Lefebvre, 1991). ULS are often identified as urban voids or vacant lots, reflecting their marginal position within the planned urban fabric (Bowman & Pagano, 2004).

Solà-Morales (1995) argues that Terrain Vague should not be understood simply as empty or unused land, but rather as spaces of ambiguity characterized by uncertainty, memory, and latent potential. These spaces are shaped by traces of past activities while remaining open to future transformation. Their lack of fixed function allows natural processes, informal occupation, and temporary uses to occur. As a result, ULS become sites for alternative urban practices, artistic expression, and spontaneous social activities (Gandy, 2022). This condition is closely related to the concept of Temporary Urbanism, which refers to the short-term and flexible activation of underused urban

spaces through adaptive, low-cost, and experimental interventions (Bishop & Williams, 2012; Lydon & Garcia, 2015; Kamvasinou & Iannizzotto, 2025). Therefore, ULS as Terrain Vague represent not only urban neglect, but also potential spaces for ecological regeneration, creativity, and adaptive urban transformation.

4. Methodology and case study context

The methodology of the study is developed based on the conceptual framework presented in Figure 1. Section 4 outlines the research design, sampling strategy, data collection procedures, analytical methods, and study limitations, providing a structured basis for interpreting the empirical findings. Figure 2 presents the detailed methodological structure of the study.

4.1. RESEARCH DESIGN & VARIABLES

This research employed a mixed-methods approach, combining qualitative and quantitative methods to achieve a comprehensive understanding of the ULS. The approach was informed by a literature review and a case study conducted in Ratmalana. Maps, charts, and photographs supported data analysis, which was collected through observations, questionnaires, and interviews. The empirical results were synthesized through thematic discussion to derive context-specific conclusions. The study systematically examined the influence of ULS on SWB of the immediate residential community through a structured classification of research variables (Figure 2).

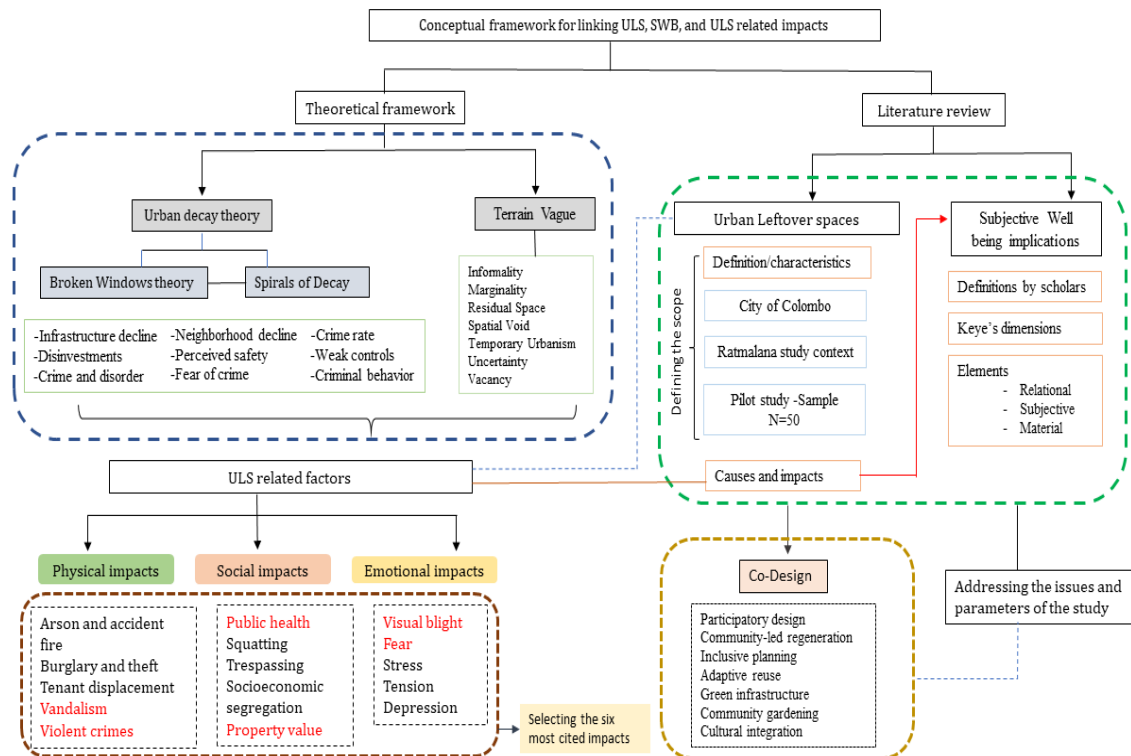


Figure 1: The conceptual framework for linking ULS and SWB (Source: Compiled by author)

This structured approach enables adaptive interpretation of complex socio-spatial relationships within changing urban landscapes.

Independent variables: Six dimensions associated with ULS impacts and SWB were selected for analysis. Although ULS produce numerous environmental, social, and economic effects, this study focused on the most critical and frequently cited impacts: **property value, public health, visual blight, fear, violent crimes, and vandalism**. These limited factors were selected due to time constraints. These indicators were selected due to their strong relevance in Terrain Vague, Urban Decay and Social Disorganization literature and their direct influence on perceived SWB.

Dependent variables: SWB indicators were assessed under the subjective dimension, reflecting social and psychological aspects of daily life and overall QOL associated with ULS. PWI-A was used as a measuring tool. It enables the assessment of cognitive and emotional responses, reinforcing the human-centered aspect.

4.2. SAMPLE AND CONTROL PARAMETERS

To ensure that participants (N=50) were within the influence zone of ULS and resided within a typical walkable distance from the site (within a 600m radius), the sample selection process concentrated on locals who permanently lived close to the selected site (Figure 3). The sample consisted of an equal number of male and female respondents (25 each) to minimize gender bias. To capture a variety of generational views and the experiences of both long-term and new residents, a range of age groups and residential periods were represented (Figure 2).

4.3. DATA COLLECTION TOOLS

Data for this study were collected using a structured questionnaire designed with three main sections to capture demographic characteristics, perceptions of ULS, and SWB. The questionnaire was translated into the local language to ensure clarity and accessibility while maintaining the original meaning of each item.

- **Section A – Demographics:** Collected background information, including age, gender, and dwelling period of residence.
- **Section B – ULS Impacts:** A personalised questionnaire assessed the six selected ULS impacts. Respondents rated the extent to which abandonment affected daily life.
- **Section C – SWB and QOL:** PWI-A was administered to adults 18 years and above and was administered in written or verbal form depending on respondent preference. Each of the seven satisfaction questions on the PWI scale corresponded to a different QOL domain, including Standard of living, Health, Achieving in life, Relationships, Safety, Community-connectedness, and Future security.

The PWI-A domains were retained in their standard original structure, while minor wording adjustments were made to ensure cultural and contextual relevance without altering semantic meaning. A small pilot test was conducted to confirm clarity, comprehension, and internal consistency of the questionnaire. These adaptations enhanced content validity by ensuring that respondents clearly understood each item within the Sri Lankan context.

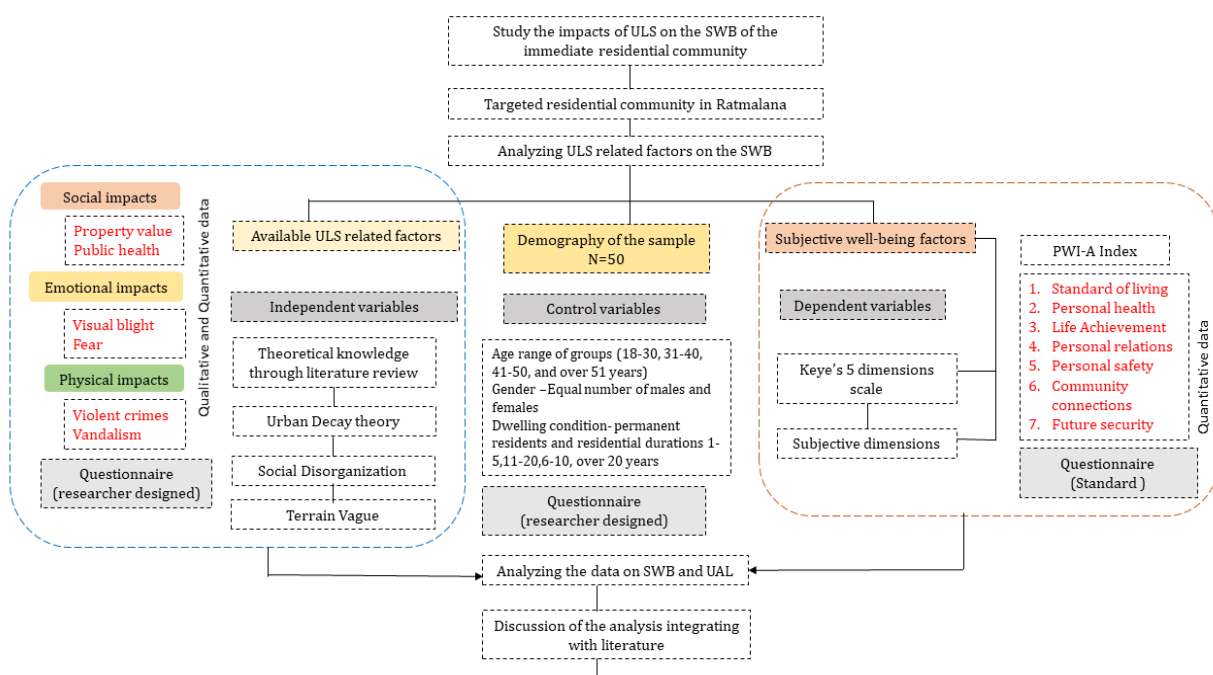


Figure 2: Research Design (Source: Compiled by author)

Satisfaction levels were measured using a 5-point Likert scale ranging from 1 (strongly dissatisfied) to 5 (strongly satisfied). For analysis, responses were treated as interval-level data and mean scores were calculated for each domain. These scores were subsequently transformed into a standardized index to derive overall SWB percentages consistent with the PWI-A methodology. Respondent identities were kept strictly confidential and were not recorded or used for any purpose beyond this study, in accordance with ethical research guidelines.

4.3.1. Limitations

This study focused exclusively on ULS within the Ratmalana railway premises and their immediate surrounding environments. Due to constraints related to time, accessibility, and scope, the sample size was limited to 50 respondents (N=50). Due to these constraints, the study is exploratory in nature and serves as a pilot-level investigation, aimed at generating preliminary insights into the relationships between ULS and SWB. Given the limited sample size and site-specific focus, the findings are not statistically generalisable to broader urban contexts. However, they provide valuable exploratory evidence that can inform future large-scale studies and urban regeneration research in similar socio-spatial environments.

4.4. DATA CLEARING AND SCORING

SWB factors and QOL measures were calculated using the standard formula. SWB was categorized as 'normal' when scores were above 70, 'compromised' when scores ranged between 50 and 60, and 'challenged' when scores were 49 or below (Tomin et al., 2015). SWB scores were standardized using the following formula:

$$\frac{X - k_{\min}}{k_{\max} - k_{\min}} \times 100 \quad (1)$$

X - The score or mean to be converted

$k_{\min}$ - The minimum score possible on the scale

$k_{\max}$ - The maximum score possible on the scale search

This transformation allowed for comparability of results across different SWB domains and facilitated clearer interpretation of QOL outcomes. It also ensured consistency in scaling across all measured variables, enabling reliable cross-domain analysis.

4.5. PROFILE OF STUDY SITE: RATMALANA RAILWAY LANDSCAPE

4.5.1. Site selection

Ratmalana, a suburb in the Dehiwala-Mount Lavinia Municipal Council, was chosen as the study location. It is an important industrial area in Colombo. Ratmalana is located 14.6 kilometers south of Colombo city centre. It hosts both industrial and densely populated residential areas. Its

strategic significance as a transportation hub made it ideal for studying the socio-spatial effects of ULS. Access to essential area services and employment opportunities further supported this choice. The site was selected to examine ULS in suburban Colombo contexts and their relationship with surrounding communities.

4.5.2. Spatial typologies of ULS

Ratmalana is one of the principal industrial concentrations within the Colombo Commercial City, where industrial activities occupy a significant share of the urban footprint. (Urban Development Authority, 2019, p. 50). The selected landscapes are located near Colombo and the Galle Main Road. As predicted, underused facilities might have persisted after this transition. Ratmalana, with its well-balanced urban character, plays a key role in the Colombo metropolitan area. It contributes to the economy, residential life, and cultural identity, making its preservation and development an important consideration.

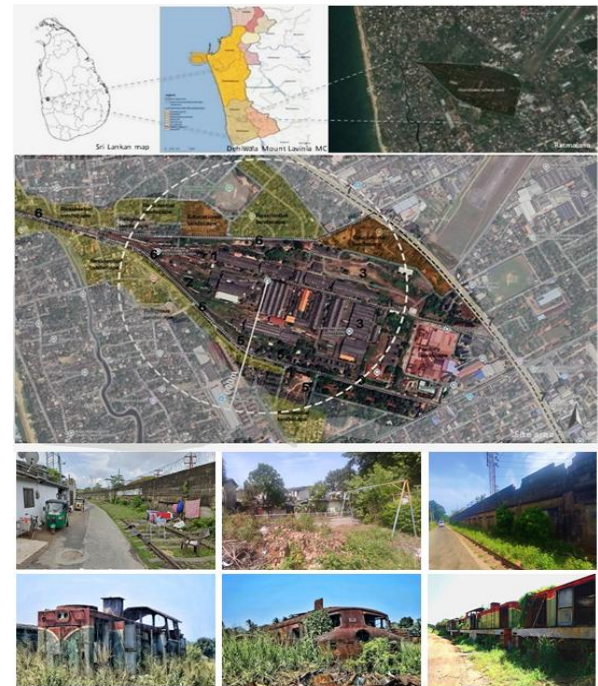


Figure 3: Site location and visuals
(Source: Compiled by author)

Note: Each of the spaces corresponds to the entries listed under the 'No' column in Table 2, enabling systematic cross-referencing between the mapped features in Figure 3 and their respective descriptions.

Figure 3 shows the boundary of the selected site, highlighting the various functional and physical areas within the study context. The zoning highlights key landscape typologies, including residential, educational, religious, and infrastructural areas. The study context was selected for analysis, thereby providing a comprehensive spatial understanding of the diverse urban character, land use patterns, and spatial relationships within the area. It

also illustrates the distribution of ULS in relation to surrounding built environments.

Table 2: Site Profile and Spatial Characteristics
(Source: Compiled by author)

No.	Spatial Category	Extent (m2)	Description
1	Disused carriageways	12,000	Located within ULS inside the railway premises
2	Vacant open spaces	7,000	Situated within ULS inside the railway premises
3	Leftover railway yard	20,600	Part of the internal ULS within the railway property
4	Inactive railway line	1,700	Located within the railway premises
5	External leftover areas	13,504	Open ULS situated outside the railway boundary
6	Station Road	–	Adjacent road network
7	Galle Road	–	Main road frontage
8	Surrounding residential zone	–	Nearby residential neighborhood

The demographic and spatial characteristics of Ratmalana provide important context for understanding the selected ULS. Ratmalana is a rapidly urbanising suburban area characterised by high-density settlement patterns, industrial land uses, and strong transportation connectivity within the Colombo metropolitan region (Urban Development Authority, 2022). Historical census data indicate population growth from 154,194 in 1971 to 184,468 in 2012, representing approximately 8% of the Colombo District population. Housing density was recorded at around 2,210 housing units per km² in 2012, ranking among the highest in the district. Future projections further suggest continued urban expansion, with the population expected to exceed 280,000 by 2030.

In addition, Ratmalana functions as a major transportation and commuter corridor, with daily commuter and visitor movements estimated at over 176,000 people. These demographic and spatial characteristics reinforce the suitability of the area for examining how railway-adjacent ULS influence the well-being and QOL of surrounding communities.

5. Results and Discussion

This section presents the key findings of the study, organised according to the ROs, including demographic profile, perceived impacts of ULS, SWB outcomes, and correlation analysis.

5.1. DEMOGRAPHIC PROFILE OF RESPONDENTS

The study sample (N = 50) included respondents across different gender, age groups, and residential durations, as illustrated in Figure 4. Participants were selected based on the criteria outlined in Section 4.2, ensuring that all respondents were residents within the immediate influence zone of the selected ULS.

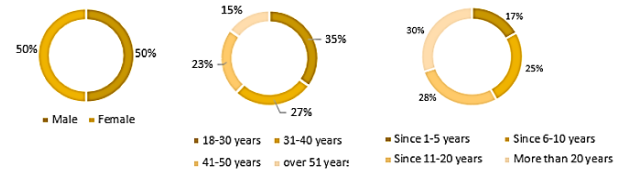


Figure 4: Demographic Profile of Respondents: Gender, Age, and Duration of Residence
(Source –Compiled by author)

5.2. PERCEIVED IMPACTS OF ULS ON RESIDENTIAL WELL-BEING

The analysis of satisfaction scores (Figure 5) indicates that ULS in and around the Ratmalana railway yard are perceived to influence residents' well-being outcomes addressing RO 2 and RO 3. The findings are consistent with Urban Decay and Social Disorganization perspectives, highlighting the interaction between physical environmental conditions and perceived social instability. In addition, these conditions reflect the characteristics of Terrain Vague, where spatial neglect, and lack of defined function contribute to fragmented and uncertain urban experiences for adjacent communities.

Socio economic impacts:

Economic impacts were significant, with **44% of respondents reporting dissatisfaction with property values** and **28% expressing strong dissatisfaction**, indicating perceived depreciation associated with proximity to degraded environments. In addition, **58% of respondents reported dissatisfaction with public health conditions**, suggesting that environmental degradation and neglect are perceived as factors that reduce neighbourhood liveability and physical well-being.

Subjective impacts:

Perceptual and safety-related concerns were also prominent. **Visual blight recorded the highest level of dissatisfaction (66%)**, followed by **vandalism (32%)**, reinforcing perceptions of environmental disorder. Safety perceptions further reflected social instability, with **42% reporting dissatisfaction regarding violent crime**, while **28% expressed fear of criminal activity**. These findings align with Broken Windows Theory (Kelling & Wilson, 1982), where visible disorder contributes to fear and reduced perceived safety, and Social Disorganization Theory (Sampson & Groves, 1989), which links weakened

social cohesion to increased vulnerability to crime.

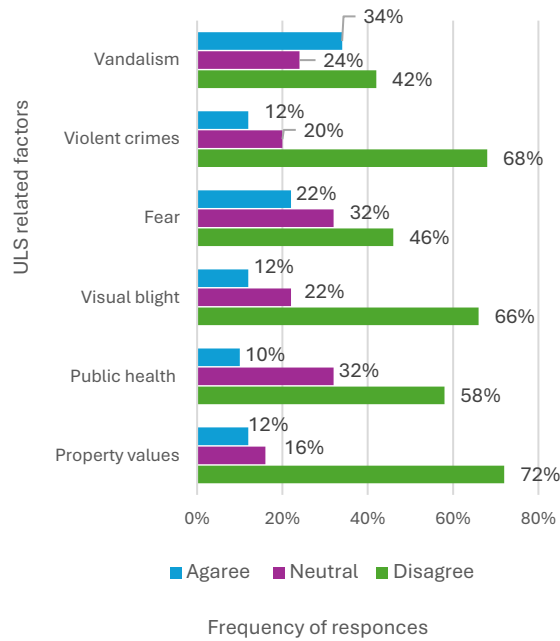


Figure 5: Frequency of ULS
(Source: Compiled by author)

Overall, the results indicate that deteriorating physical conditions in ULS are closely associated with reduced SWB. These findings support broader urban studies literature suggesting that spatial neglect and uneven development patterns contribute to socio-spatial inequality and psychological stress (Harvey, 2005; Handy et al., 2006). Conversely, evidence shows that the rehabilitation of vacant and underutilised land can improve safety perceptions, reduce crime, and enhance community well-being (Branas et al., 2018; Lambin et al., 2003; Tavakoli & Marzbali, 2021).

As shown in Figure 6, visual blight recorded the lowest mean satisfaction score ($M = 2.12$), indicating the strongest negative perception among respondents, while vandalism ($M = 2.94$) represented a comparatively less severe but still notable.

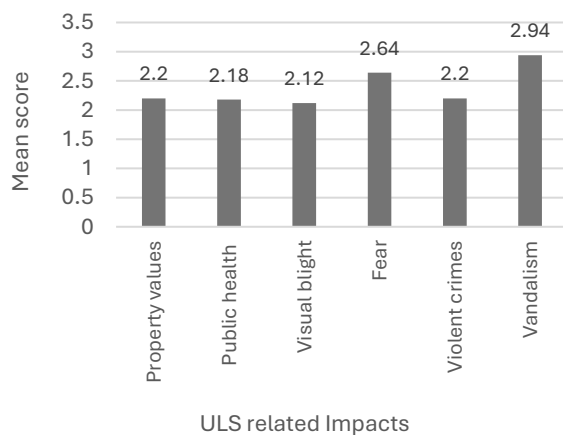


Figure 6: Mean values of the satisfaction level of UAL factors
(Source: Compiled by author)

5.3. SWB METRICS (PWI-A SCORES)

The analysis of satisfaction scores for SWB factors (Figure 7) reveals that ULS in Ratmalana have multidimensional effects on QOL, influencing both physical conditions and SWB. At the **physical and economic level**, half of the respondents expressed dissatisfaction with their standard of living, while 38% reported health-related concerns. This indicates that environmental negligence is associated with reduced living standards and declining physical well-being. At the **social level**, the impacts are equally evident. A considerable proportion of respondents reported weakened personal relationships, with 40% dissatisfied and 10% strongly dissatisfied. Additionally, 34% were dissatisfied and 20% strongly dissatisfied with their sense of community connection, suggesting growing feelings of marginalization and reduced social cohesion.

At the **psychological level**, dissatisfaction with life achievements reflects reduced life satisfaction and increased stress linked to living in proximity to degraded environments. Most critically, **future insecurity emerged as the dominant concern**, with 74% of respondents expressing uncertainty about their future (44% strongly dissatisfied and 30% dissatisfied), and no respondents reporting satisfaction. This highlights that the influence of ULS extends beyond present conditions to long-term perceptions of stability and opportunity. Overall, these findings indicate that ULS in Ratmalana contribute to declining SWB across multiple dimensions, reinforcing the relationship between environmental neglect, weakened social structures, and reduced QOL.

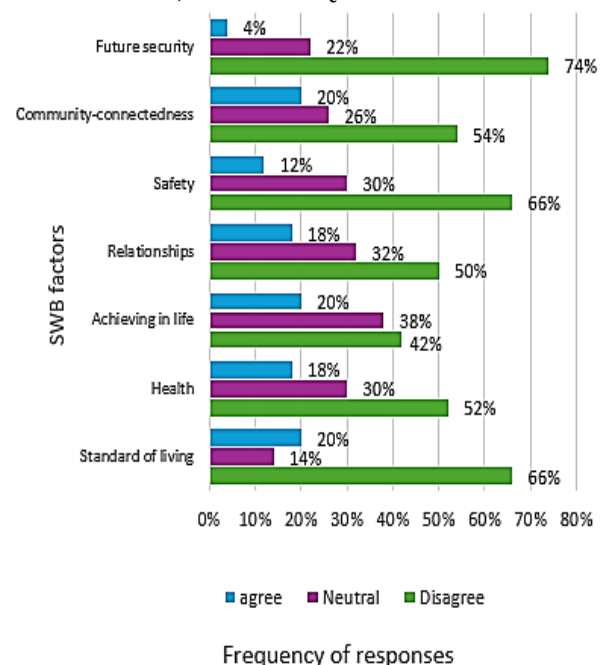


Figure 7: Frequency of SWB factors
(Source: Compiled by author)

5.3.1. PWI-A Interpretation

The results indicate that “future security” recorded the lowest mean score ($M = 1.86$), reflecting strong uncertainty

regarding future conditions. In contrast, “achieving in life” recorded the highest mean score ($M = 2.72$) (Figure 8). The overall mean SWB score was 2.44, corresponding to 36% on the PWI-A scale (Equation 1). This places the sample in the “challenged” category, indicating low SWB and difficulties across multiple life domains.

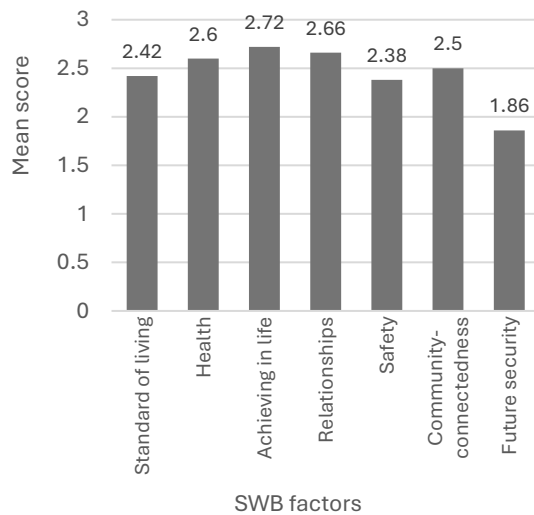


Figure 8: Mean values of the satisfaction level of SWB factors (Source: Compiled by author)

5.4. CO-RELATIONAL DYNAMICS (HEATMAP ANALYSIS)

The correlation matrix (Figure 9) reveals associations between physical environmental conditions and perceived well-being outcomes in the study area. Declining property values were associated with increased perceptions of insecurity, demonstrated by negative correlations with violent crime ($r = -0.212$) and fear ($r = -0.336$). This suggests that deterioration in the physical environment is linked to reduced perceived safety among residents. In contrast, a weak positive relationship between property values and health ($r = 0.274$) indicates that improved environmental conditions are associated with better perceived health outcomes.

The analysis also shows interconnections between indicators of physical disorder and social instability. Fear and vandalism were moderately correlated ($r = 0.267$), while vandalism and violent crime showed a similar relationship ($r = 0.279$), suggesting that visible environmental neglect is associated with heightened perceptions of insecurity. Finally, the positive correlation between personal relationships and life achievement ($r = 0.252$) reflects internal consistency within SWB dimensions, indicating that improvements in one aspect of well-being are associated with improvements in others. Overall, the results highlight that physical deterioration in ULS is not isolated but is associated with perceptions of safety, social cohesion, and overall well-being.

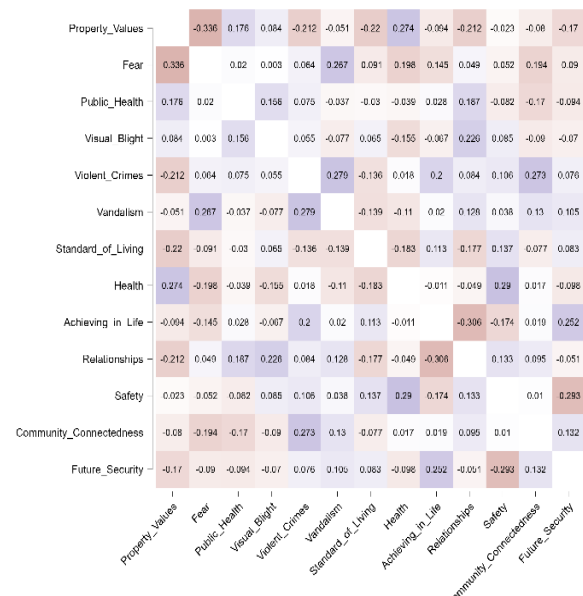


Figure 9: Heatmap of correlation analysis (Source: Compiled by author)

6. Conclusion and future projection

The findings indicate strong associations between ULS conditions and reduced SWB and QOL in adjacent residential communities. The study served as an analytical framework to examine how patterns of urban neglect reinforce socio-spatial inequality, marginalization, and psychological distress. Visual degradation, perceived insecurity, and uneven spatial investment were identified as key drivers contributing to measurable declines in SWB. The findings further demonstrate that prolonged exposure to degraded urban environments affects both present living conditions and long-term perceptions of safety, stability, and future security.

The study establishes a theory-driven framework linking policy-induced urban neglect with observable socio-spatial and well-being outcomes, integrating perspectives from Social Disorganization Theory, Broken Windows Theory, and Terrain Vague concept interpretations of indeterminate urban space. This highlights the dual nature of ULS as both manifestations of urban decline and potential sites for adaptive transformation when addressed through inclusive planning and design approaches.

The research is limited by its cross-sectional design, which restricts the ability to generalize findings across different temporal contexts and does not capture long-term spatial or social transformations. Additionally, the relatively small sample size limits broader statistical generalization. Despite these limitations, the study provides a valuable preliminary assessment tool for urban planners and policymakers, emphasizing the importance of human-centered perceptions in spatial decision-making and urban regeneration strategies.

Future recommendations are based on,

- Future studies should expand the spatial scope beyond the Ratmalana railway context to include different urban typologies (e.g., industrial, residential, and commercial fringe areas) to test the consistency of ULS, SWB and QOL relationships.
- Longitudinal research designs are recommended to examine how prolonged exposure to ULS influences SWB and QOL over time, rather than relying on cross-sectional observations.
- Larger sample sizes should be used in future studies to improve statistical generalizability and strengthen the robustness of findings.
- Future research should explore causal relationships between ULS characteristics and SWB outcomes using advanced analytical methods.
- Comparative studies across different cities or regions (including other South Asian urban contexts) are recommended to test the transferability of ULS conceptual frameworks.
- Further research is needed to refine and test theoretical interpretations of ULS (e.g., Terrain Vague, Social Disorganization Theory, and Urban Decay) across different cultural and socio-spatial settings.
- Future studies may also adopt a multi-layered socio-spatial analytical approach, examining how impacts operate across different human experience levels such as the individual perception layer (micro level), household/community interaction layer (meso level), and urban/system layer (macro level) to better capture the complexity of how ULS influence SWB.

Overall, the study contributes to broader discussions on SWB oriented urban development, emphasizing that responsive, inclusive, and socially connected design can enhance both individual QOL and collective urban sustainability.

7. Citations, References and Acknowledgements

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Conflict of Interest

The authors declare no conflict of interest.