



URBAN INFRASTRUCTURE DEVELOPMENT AND PERCEIVED SOCIO-ECONOMIC IMPACTS: A COMMUNITY PERCEPTION STUDY OF THE KEGALLE ALTERNATIVE ROAD, SRI LANKA

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ABSTRACT

Urban infrastructure development is a critical dimension of contemporary urban planning. Socio-economic impacts on residents, businesses, and relevant communities remain insufficiently examined in the Sri Lankan context. The study investigates the community perspective for economic and urban changes associated with the construction of the Kegalle alternative road. Furthermore, the study examines the potentials and challenges of the Kegalle and Mawanella cities using Multi-Criteria Analysis in delineating urban planning boundaries within both municipalities. The Kegalle Urban Development Plan (2030) and the Mawanella Urban Development Plan (2023–2033) by Urban Development Authority, Sri Lanka, were reviewed for the whole study. Mixed method approach was employed for the study. The survey questionnaire instrument was analyzed through the quantitative descriptive statistics and field work observations, community perspectives, and potential and challenges reviews were done by qualitative approach. A brief questionnaire is used for the survey data collection, and the sample was derived using a purposive sample. The collected data of 50 urban community members were categorized, tabulated, and analyzed. The 60% of the respondents expressed a negative economic impact resulting from the alternative road. The negative responses are based on the old Colombo-Kandy road, which results in fewer urban crowds after the construction. In contrast, for the view of the urban changes, 77% of respondents acknowledged the positive impact. They admired most prominently the reduction of traffic congestion. The study further identifies significant development potentials in both cities. Including strategic locational, tourism potential, and

administrative prominence, there are identifiable strengths in the two cities. Critical planning challenges can be distinguished, such as inadequate infrastructure, environmental degradation, and ethnic conflict. The results recommend that future urban planning interventions incorporate structured public awareness programmes to enhance community engagement. Ensuring the socio-economic benefits of infrastructure development are equitably distributed among urban residents. Risk-sensitive land use planning and heritage conservation frameworks were proposed due to the disasters.

Keywords: Community perception, Kegalle, Multi-criteria analysis, Sri Lanka, Urban infrastructure, Urban planning

1 Introduction

Urbanization is a key term that determines the next decades in sustainable development. It can be simplified into a milestone that civilization and the capitalist economic system took in their evolution (Harvey, 2008; Lichtenstein, 2006). However, from the lens of the third world, rapid urbanization is a one destination; they plan to take over. On the other hand, it is an inevitable phenomenon that they cannot overlook (Healey, 1997). Therefore, urbanization is an important tool of development that cannot be avoided and is inevitable. Countries have to face the reality of the development of urbanization and make the necessary decisions to overcome the negative impact of urbanization and acquire sustainable urban development (Montgomery, n.d.). In this significant moment, urban planning plays a crucial role in urban development that cannot be replaced (Watson, 2009).

Urban planning combines long-standing policy decisions with short-term human needs (Healey, 1997). In urban policies, it makes decisions for the next few decades from a rationalized point of view (Watson, 2009). In the development, the Eurocentric top-down decision-making approach urges rational decisions that take for future of the civilization by the planning experts and political authorities. On the contrary, the general public and the urban citizens who live in the cities, in their day-to-day life, organize their lives according to their needs and wants. It may show short-term and limited decisions relative to their lives. Even though, without any theoretical rationalization, the way they organize their lives and the decisions they make are more practical and highly rational in grassroot level (Arnstein, 1969). However, policy decisions and urban citizens' decisions conflict if it does not address each other's needs. In other words, urban policy and urban citizens' conflicts diminish the sustainable and inclusive outcome of the development. Therefore, urban planning should consider both policymakers' rational thinking and the general public's practical thinking into account. It empowers inclusive and sustainable urban development (Fainstein & DeFilippis, 2016). In the Sri Lankan context, there is limited literature that addresses both the top-level planning perspective and the bottom-level

urban citizen. Moreover, literature addresses the sustainability of infrastructure project in multi-perspective stance is rare and have less attention. The present study examines the urban planners' perspective through the Kegalle Urban Development Plan and the Mawanella Urban Development Plan, and the general public's perspectives in the same cities regarding the Kegalle Alternative Road. The insights on the local cities in multi-perspective with theoretical basement like multi-criteria analysis (MCA), support the planners in urban planning in these cities. The study further supports scholars and policymakers in constructing a systematic framework to review the challenges and capabilities for local cities. Thus, this study is a scholarly contribution to a systematic framework for inclusive evidence-based decision-making in urban planning and addressing the literature gaps in reviewing the application of urban planning for local cities.

2 Objectives

Sri Lanka's most recent urban development plans by the Urban Development Authority (UDA) can be considered as a comprehensive understanding of how the theoretical knowledge acquired is applied in practice. Therefore, the Kegalle Urban Development Plan and the Mawanella Urban Development Plan by UDA are used for this purpose and review the spatial and socio-economic conditions of the cities. Thus, identifying the potentials and challenges in Kegalle-Mawanella town under the urban planning and practical guidelines by the UDA urban plan documents is the first objective. Secondly, under the background conditions, assess the socio-economic impact of the Kegalle Alternative Road in the Kegalle-Mawanella urban context. The assessment is carried out through the perception of the urban citizens in the study area. Building upon the theoretical and practical knowledge gained through the academic discussion, the subsequent component of the field visit was dedicated to conducting a scholarly study of an implemented urban planning project through brief interviews with members of the public. The two key objectives can be summarized as follows:

- I. Identifying the potentials and challenges in Kegalle-Mawanella town, referring to the urban planning documents by UDA, and under the practical urban guidelines of Multi-criteria analysis (MCA)
- II. Assessing the socio-economic impact of the Kegalle Alternative Road in the Kegalle-Mawanella urban context

3 Methodology

A mixed-method research design was employed for the study. Integrating qualitative documentary analysis with quantitative primary field survey methods was utilized. The qualitative component involved a systematic review and analysis of the Kegalle Urban

Development Plan (2030) and the Mawanella Urban Development Plan (2023–2033). Both planning documents were produced by the Urban Development Authority. Using these two documents, was examined urban potentials and planning challenges. Moreover, the application of MCA in boundary delineation across functional, physical, and administrative criteria categories was studied. MCA was used as a main urban guideline to derive the potentials and challenges of the cities, delineating socio-economic, environmental, and cultural aspects of the study area. Through lectures and discussions, the manner in which the potentials and challenges of the cities of Mawanella and Kegalle were further examined. Spatial analyses, by conducting an in-depth study of land use and spatial organization within the planning process, were prominently highlighted using the UDA planning documents, lectures, and discussions.

The quantitative component involved a structured field survey conducted in the city of Kegalle. A purposive sample of 50 urban citizens was selected. Mainly, urban residents, vendors, and service providers who live and work in the city were selected to enhance the quality of the sample to fulfill the objectives of the study. Data were collected through a structured questionnaire as the primary basis for analysis. The questionnaire examined respondent perceptions of changes in economic activities and broader urban changes attributable to the construction of the Kegalle alternative road. The survey provided multiple response options to the respondents, and respondents can add new ideas and perceptions under the other category of the multiple response questionnaire. The survey yielded 75 responses pertaining to economic changes from the 50 respondents of the sample. 94 responses pertaining to urban changes from the same respondents of the sample. Responses were categorized into 14 and 12 response types and tabulated. It was analyzed through a percentage frequency distribution. Qualitative insights gathered through direct field observation. Sometimes, informal interactions with respondents were used to contextualize. It was used to supplement the quantitative findings.

4 Results

4.1 Urban Planning Boundaries through Multi-Criteria Analysis

Multi-criteria analysis may be characterized as a systematic approach designed to support complex decision-making processes in accordance with predetermined criteria and objectives (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, n.d.). It is particularly suited to complex decision-making problems that involve multiple and potentially conflicting objectives and criteria. The integration of multi-criteria analysis with Geographic Information Systems (GIS) may further be understood as a collection of methods and tools for transforming and combining spatial (geographical) data and preferences (value judgements) to generate information for decision-making purposes.

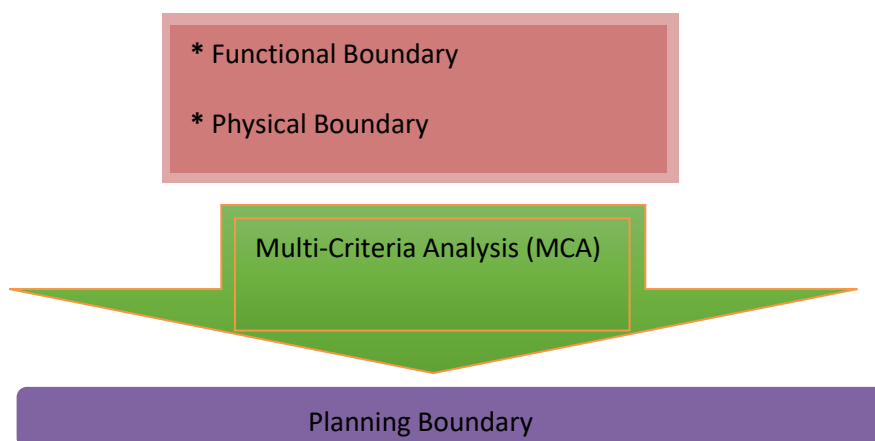
Accordingly, within a GIS context, multi-criteria analysis constitutes a decision-making digital technique. It enables the evaluation and comparison of multiple alternatives using

several criteria or factors. The objective of multi-criteria analysis is to identify the best or most suitable alternative in accordance with the selected criteria. Within a GIS framework, multi-criteria analysis utilizes geographical data for evaluation purposes. The evaluation may incorporate information pertaining to location, topography, vegetation, hydrology, geology, infrastructure, population, and other factors that are relevant to the decision-making process.

The application of multi-criteria analysis in urban planning is widely observed in practice. Urban planning is subject to examination across multiple disciplines. The principal reason for use of MCA is that. Planning must be carried out through the analysis of diverse criteria. Consequently, multi-criteria analysis is mainly employed from the preliminary survey stage. It constitutes the initial phase of the urban planning process. Through this approach, it is possible to identify the study area for urban planning. The present study selected the Kegalle and Mawanella. To develop a realistic understanding of various conditions, including topography, environmental factors, and socio-economic factors, MCA can be utilized. With the aim of formulating and implementing more effective plans, it provides a systematic approach. In particular, multi-criteria analysis is employed in urban planning to delineate environmentally sensitive areas and to identify the most suitable zones for development. It facilitates the derivation of the planning boundary.

As a practical illustration, the application of multi-criteria analysis is discernible in both the Kegalle and Mawanella urban development plans. In both instances, multi-criteria analysis was employed to delineate the respective planning boundaries (Urban Development Authority, 2023). In this regard, the criteria may be classified under three broad categories. The planning boundary is derived through the multi-criteria analysis of these three criterion sets. Figure 1 below illustrates this process in greater detail.

Figure 1: Process of Delineating the Planning Boundary (Urban Development Authority, 2023)



Functional Boundary: Functional boundaries refer to the limits associated with a practical process within a given area designated for functional zones. When the activity of an area ceases, the functional zone ends and its boundaries cease to exist. For instance, where commercial activity is present within a functional boundary, it constitutes a commercial functional boundary, while an area defined by agricultural activity represents the boundary of that particular activity. Accordingly, the Kegalle and Mawanella urban development plans have conducted analysis under this criterion using functional indicators such as land use, population density, connectivity, building density, road density, and services.

Physical Boundary: Physical boundaries represent the most visibly discernible limits between areas. A physical boundary is a naturally occurring barrier between two areas, and may include rivers, mountain ranges, oceans, and deserts. The criteria under this category are thus defined by the boundaries created by the physical environment. Multi-criteria analysis within the Kegalle and Mawanella urban planning frameworks has been conducted using a range of criteria, including water resources, catchment areas, vegetation cover, reservoirs, slope and elevation, and disaster-prone areas such as landslide-risk zones.

Administrative Boundary: An administrative boundary refers to the limit or demarcation of a geographical area under the jurisdiction of a particular governmental or management authority. Accordingly, multi-criteria analysis within the Kegalle and Mawanella urban planning frameworks has been conducted with reference to official administrative boundaries. In particular, provincial boundaries, district boundaries, Divisional Secretariat boundaries, and Grama Niladhari division boundaries have been utilized in both planning processes from the baseline survey stage onwards.

In this manner, the planning boundaries for both Kegalle and Mawanella have been determined by addressing a range of criteria across three primary criterion categories. It is important to note the significant changes identified through the application of multi-criteria analysis in the Mawanella urban planning process. In 2004, the Mawanella urban planning boundary, according to UDA, covered an area of merely 4.7 square kilometers. However, the analysis of criteria mainly included population pressure, population density, infrastructure density, and land use patterns. The new urban planning boundary designated in 2022 was expanded to encompass an area of 119 square kilometers under the MCA study. Through these studies, the planning process was rendered more systematic. It helped UDA to identify environmentally sensitive areas, wetlands, water sources, and infrastructure networks, as well as areas of higher development potential. Furthermore, multi-criteria analysis provided the necessary capacity to establish the development plan on the ground with a defined trajectory. Overall, multi-criteria analysis contributes a practical, spatial, and precise analytical dimension to the urban planning process. The present study conducts a potential and challenges review based on the

MCA, selecting the points considering diverse socio-economic, environmental, and cultural boundaries of Kegalle and Mawenella towns.

4.2 Urban Planning Potentials of Kegalle

Urban planning can be used as an approach to organize a city systematically. It developed more sustainably. Presenting the potential and the challenges of the city enables a significant foundation for the implementation of a more robust and effective planning framework. The city of Kegalle spans an area of 45.8 square kilometers. The city of Kegalle possesses several distinctive urban potentials. Those can be rendered as a conducive subject for comprehensive urban planning (Urban Development Authority, 2023). According to the Cambridge Dictionary, potential is defined as "the ability to develop, achieve, or succeed in something." (Cambridge Dictionary, 2023). Therefore, urban potential in this context may be understood as the capacity of the city of Kegalle. It helps to develop and achieve growth based on its inherent characteristics. Given these existing potentials, there is considerable practical significance. Advancing the city of Kegalle through a coherent and well-structured urban planning framework is the goal. These potentials may be elaborated under several key dimensions.

1. Locational Advantages

The geographical location of Kegalle city has a number of significant potentials. The scope of these locational advantages is further broadened through the city's connectivity. It connects to Sri Lanka's existing infrastructure networks and further broader socio-economic systems. Position along the A1 Highway. The city of Kegalle is connected to the country's Class A and primary road network. Kegalle city is connected to the Colombo–Kandy railway line. It is one of the first and currently operational railway routes in Sri Lanka. It offers significant potential for the transportation of commercial and industrial goods, as well as the movement of large volumes of passengers. Notably, the connection to the national railway network represents a distinctive advantage for Kegalle. Because it is an asset not shared by Ratnapura, the other principal city of Sabaragamuwa Province. Kegalle is positioned within an established tourist corridor. As a city situated in close proximity to Kandy along the Colombo–Kandy route, it has this opportunity. Furthermore, Kegalle is recognized as the second most highly connected town within the Kegalle District.

2. Prominence at the National and Provincial Levels

The city of Kegalle may be identified as a principal city at both the provincial and district levels. Kegalle has been designated as a second-tier city within Sabaragamuwa Province. It holds the position of the foremost city within the Kegalle District. At the national level, Kegalle has already been classified as a Level 5 urban centre.

3. Potential for Development as an Administrative City

As noted above, Kegalle's classification as a Level 5 city at the national level, combined with its prominence at the provincial and district levels. It positions it as the primary administrative unit between the cities of Ratnapura and Kandy. The concentration of government administrative offices within the city. the Kegalle District Secretariat, the Ceylon Electricity Board Regional Office, the Land Registry Office, the Disaster Management Coordination Unit (DMC Kegalle), the Rubber Development Department, the Kegalle Municipal Council Office, the Grama Niladhari Office, the National Building Research Organization Office, the National Water Supply and Drainage Board Kegalle Office, the Industrial Development Board Office, and the Department of Industries Office can be included of the administrative institution list.

4. Potential for Development as a Tourism Hub

According to the National Atlas of Sri Lanka, the country is divided into seven tourism zones (Survey Department of Sri Lanka, 2007). Kegalle city is situated at the confluence of three major tourism zones. The Greater Colombo zone, the Central Highlands zone (encompassing Ratnapura and Nuwara Eliya), and the Ancient Cities zone (comprising cities such as Kandy and Kurunegala) can be identified as those. Furthermore, the Dedimunda Devalaya (Ridee Viharaya), Bopath Ella Falls, Kotmale Reservoir, Pinnawala Elephant Orphanage, the Millennium Elephant Foundation, the Royal Botanic Gardens at Peradeniya, and Asupini Falls are the key attractive places of the city and around the city (Sri Lanka Driver Guide, 2023). Kegalle holds considerable potential to be planned as a prominent tourism hub.

5. Optimal Population

According to the Urban Development Authority, the urban planning area of Kegalle has a population of 63,507. The city's population density, which stands at 1,367 persons per square kilometer (Urban Development Authority, 2023). The proposed Kegalle Urban Development Plan indicates that the city retains the capacity for continued population growth. Population is a resource that can be known as human resources. Kegalle has the potential to be an expansive city by enhancing its urban attractiveness and strengthening its human resource base. As the city's population has yet to reach its maximum carrying capacity and its resources have not been subjected to excessive consumption or depletion, Kegalle may be characterized as a city with a notably low incidence of human-induced disasters. The absence of severe overcrowding has resulted in comparatively limited socio-structural challenges such as solid waste overflow and sewage-related issues. Consequently, Kegalle demonstrates considerable potential for development as a sustainable city.

6. Climatic Favourability

The city of Kegalle experiences a temperate climate for the greater part of the year. Its location within the wet zone ensures rainfall. The mean annual temperature of Kegalle is recorded at 25.2°C (77.3°F). Annual precipitation is approximately 2,306 mm, which is equivalent to 90.8 inches per year (Climate Data, 2023). Given its proximity to the equator, the city of Kegalle does not experience a distinctly defined summer season. The combination of this geographical positioning with the climatic characteristics of the wet zone has produced a temperate and broadly conducive environment for general human habitation. It enhances the overall comfort of the environment. The climatic stability necessary for the development of Kegalle into a thriving tourist and commercially active city.

7. Minimal Ethnic Conflict

The city of Kegalle does not exhibit social fragmentation. It may arise from the historical significant of ethnic diversity or cultural divisions. Notably, the ethnic tensions were observed in the neighbouring city of Mawanella. But it is largely absent in Kegalle. Thereby presenting a strong foundation for developing the city as an inclusive and cohesive urban centre with a civic-minded urban population. In summary, the city of Kegalle possesses a range of significant urban potentials. The effective integration of these potentials into the urban planning process provides a substantial basis for directing the city towards a higher trajectory of sustainable development.

4.3 Urban Planning Potentials and Challenges of Mawanella

Mawanella is a small sub-urban town in Sri Lanka that has developed as a transitional settlement since the colonial era. The traditional buildings lining the old Colombo-Kandy main road reflect the town's historical character and continuity. Over time, the city has acquired a range of development potentials. Equally, the planning process by UDA has revealed a distinct set of challenges. Those are particular to Mawanella. A number of potentials may be identified in the urban planning of Mawanella. In particular, the Mawanella Development Plan 2023–2033 has identified several such potentials (Urban Development Authority, 2023). These potentials may be examined across several dimensions.

1. Infrastructure and Urban Connectivity

Mawanella is a city that is well-connected at the national level in terms of infrastructure. For instance, it possesses the capacity to establish national connectivity through three distinct modes. The highway corridor, the railway line, and the expressway network are those three modes. Mawanella has thus emerged as a city with considerable potential within a transport infrastructure network connecting several major urban centres, including Kandy, Ratnapura, Gampaha, Kurunegala, Matale, Badulla, and Colombo. In particular, the potential for connectivity via an expressway has already been identified

through the Mawanella corridor. Furthermore, connectivity along the Colombo–Kandy A1 highway represents a significant potential, and there exists a special opportunity to plan Mawanella as a gateway city to numerous towns in the interior of the country via the A1 road.

Mawanella has emerged as the most highly connected town in the Kegalle District, surpassing all other major towns. It attains the highest level of connectivity with a value of 1.4971, surpassing even the city of Kegalle. In addition to the A1 highway, the Mawanella–Rambukkan road and the Mawanella–Hemmathagama road provide further connectivity, presenting the potential to develop Mawanella into a more accessible urban centre that draws together both rural communities and urban populations.

2. Potential for Development as a Tourist City

This potential has been specifically highlighted in the new urban development plan. Mawanella is situated along a major tourist route directly connected to Kandy, and lies on the popular tourist circuit linking Kandy, the Central Highlands, the Cultural Triangle, Colombo, the southwestern coastal belt, and Yala. Existing tourist attractions, including the Saradiel Village, Utuwankanda, Alutnuwara Devalaya, Maa Oya, Kadugannawa Scenic View, Bo Ella, Devangala, Ambulugala Tampita Viharaya, and Dhanagiri Gala Raja Maha Viharaya collectively generate substantial tourism potential. Furthermore, the area and its surroundings offer attractive scenic views. Several sites contain archaeological, historical, and natural features of significance. Notably, 29 archaeological sites are located within the planning boundary of Mawanella. Annual tourist arrivals in the vicinity of the Pinnawala tourism zone are estimated at approximately 1,048,000 (Urban Development Authority, 2023). Mawanella is situated within the proposed East-West Economic Corridor. It was outlined in the National Physical Planning Department (NPPD) plan.

3. Emergence as a Prominent City

Mawanella possesses considerable potential for development as a prominent city at both the provincial and district levels. It is only second to Kagalle town in the district. Its designation as a third-tier city within Sabaragamuwa Province. In addition, its classification as a second-tier city within the Kegalle District. It affords a distinctive position within the district.

4. Commercial and Service Centre

Mawanella functions as a highly connected, diversified, and active commercial and service centre (Urban Development Authority, 2023). The city serves a diverse range of active service and commercial needs, supported by strong road connectivity within the region. The further development of these urban characteristics presents a clearly identifiable and significant urban potential.

5. Agricultural Prominence

The agricultural sector contributes substantially to the regional economy, with 40% of the total land utilized for agricultural purposes, contributing 23% of rice production within the Kegalle District, alongside considerable potential for export crop cultivation (Urban Development Authority, 2023). Mawanella possesses considerable scope for development as an urban centre with strong potential in urban agriculture and its associated economic activities.

In addition to the detailed potentials outlined above, the following are also noteworthy:

1. An economically active population comprising 51% of the total population.
2. The contribution of diverse ethnic communities to a multi-diversified economy through ethnic and religious diversity.
3. Strong urban attractiveness, with Mawanella drawing a daily commuter population of approximately 70,000.
4. Rich natural environmental features, with 17% of the total land area covered by natural environmental characteristics.

In addition to the aforementioned potentials, the Mawanella urban planning process has identified a number of significant challenges. These challenges affect the urban environment of Mawanella in various ways and are likely to present further obstacles in the future. Accordingly, the following challenges have emerged as significant constraints in the urban planning of Mawanella.

1. Inadequate and Uneven Physical Infrastructure

UDA has identified the scarcity of physical infrastructure, mainly within both urban and planning boundaries. Informal constructions are proliferating, and it has created a risk of natural hazards like flooding. The absence of a systematic drainage structure further exacerbates the flood risk. Significant challenges have arisen due to the transport infrastructure. It is not due to the lack of infrastructure, but misusing the available infrastructure facilities. The obstruction of side roads due to commercial activities results in traffic congestion. The lack of public parking facilities and the inadequacy of pedestrian pathways collectively impact for inefficient and weak public space in the city.

The inadequacy of infrastructure for agricultural and tourism development constitutes a particularly sensitive challenge in urban planning. Sanitary facilities, rest areas, and directional signage necessary for the promotion of the tourism industry remain limited. The Urban Development Authority has specifically identified a shortage of tourist information centres. Within the industrial sector, facilities for fields with tourism appeal and commercial potential, such as traditional handloom weaving using power looms, remain constrained. The absence of infrastructure to support innovative urban agriculture or agro-industrial development represents a significant obstacle to modernization. The

lack of an economic centre and export processing hub further compounds these economic challenges. Reflecting deficiencies in both economic and social infrastructure, Mawanella experiences a shortage of potable water. Furthermore, there is an insufficient number of schools both within and outside the city, and existing schools lack adequate facilities. Across multiple sectors, infrastructure thus demonstrates an uneven and deficient distribution.

2. Environmental Degradation and Loss of Distinctive Character

The absence of a programme for the conservation of archaeological and historical sites has resulted in the gradual erosion of the city's distinctive heritage. Attention to environmentally sensitive zones has also been severely lacking, and the failure to identify and demarcate forest boundaries and other sensitive areas has accelerated their degradation, as evidenced by incidents of burning in areas associated with the Alagalla forest reserve. The discharge of wastewater into water sources continues to occur, while human activities have obstructed primary water sources, with 30% of riverbanks encroached upon by construction. Additional environmental concerns include unauthorized sand dumping near the Maa Oya, development activities within forest reserves, the inadequate gazette notification of rivers and streams, the unauthorized filling of paddy fields and wetlands, and the obstruction of attractive highland scenery through physical development. Such activities constitute destruction, over-exploitation, and misuse of the urban environment and natural landscape. Between 2000 and 2020, 4% of green cover has been lost.

3. Natural Disasters and Weak Disaster Management

Approximately 54% of the total land area comprises slopes susceptible to landslides. Of particular concern is the fact that 15% of landslide-risk areas are occupied by human settlements (Urban Development Authority, 2023). The failure to take appropriate measures in response to these challenges, and the absence of planned resettlement programmes and effective disaster management, constitute a significant concern.

In addition to the above, the following challenges merit brief consideration:

1. Urban poverty, with 46% of households in the Mawanella area surviving on a monthly income of less than LKR 20,000.
2. The absence of a designated location for the distribution of industries.
3. The recurring incidence of ethnic conflict and the lack of a systematic policy framework for reconciliation.
4. Constraints on land utilization arising from the extensive presence of Nayakkara traditional landholdings. In particular, a significant proportion of these traditional lands remain underutilized, and no programme exists to integrate them into the economic process.

Except for these challenges, notably, ethnic tensions were observed in the neighbouring city of Mawanella. Through these dimensions, the Mawanella Development Plan has afforded the opportunity to identify both a range of potentials and a number of significant challenges pertaining to the city's development.

4.4 Economic Impact of the Kegalle Alternative Road

The construction of any infrastructure facility inevitably exerts a significant impact on the economic activities of the population. Accordingly, the population assesses the impact on economic activities in various ways. A total of 50 respondents were engaged with respect to changes in economic activities, yielding 75 responses. These responses may be categorized and analyzed under 14 distinct response types. The chart below presents the categorized data as a percentage of the total 75 responses, thereby enabling an analytical interpretation of the relative strength and quantitative significance of the various responses through the surveyed data.

Table 1: Changes in economic activities due to the alternative road (based on survey data)

Positive	% of Respondents	Negative	% of Respondents
Reduction of traffic congestion	11%	Reduction in service visitors	8%
Ease of time management	1%	No change in economic activities	28%
Ease of access to workplace	1%	Road obstruction	1%
Positive economic impact observed	16%	Reduction in visitor numbers	1%
Economic activities being generated	5%	Continued use of main road	1%
Reduction in fuel consumption	3%	Negative economic impact observed	20%
Employment opportunities created	1%		
Arrival of new residents	1%		
Total	40%	Total	60%

The largest proportion of responses indicated that no change had occurred as a result of the alternative road, accounting for 28% of all responses. The second largest category of responses, representing 20% as indicated in the figure above, reported a negative economic impact on their livelihoods as a result of the alternative road. Both the predominant personal survey experience and data analysis indicate that 16% of

respondents directly reported a positive economic impact resulting from the alternative road. With regard to economic impacts, the reduction in customer footfall, representing 8% of responses, reflects a contraction in the service economy. Furthermore, 20% of respondents, constituting one-fifth of all responses, indicated that the alternative road had not produced a positive economic impact. Overall, the table above attempts to broadly categorize the total response categories as positive and negative with respect to the economic changes brought about by the alternative road, and to derive a cumulative value therefrom, enabling a more precise analytical conclusion. The table presents the classification of positive and negative responses along with the resulting cumulative values. Accordingly, a majority of 60% of respondents expressed negative views regarding the economic changes brought about by the alternative road.

4.5 Urban Changes Brought About by the Kegalle Alternative Road

The construction of an infrastructure facility exerts a direct impact not only on the economic activities of the population but also on urban life more broadly. It is possible to assess the impact on economic activities as well as the associated social and environmental effects in various ways. A total of 50 respondents were engaged with respect to changes observed in the city, yielding 94 responses. These responses may be categorized and analyzed under 12 distinct response types. The chart below presents the categorized data as a percentage of the total 94 responses, thereby enabling a quantitative and ideological analysis of the various responses through the surveyed data.

Table 2: Changes in the city due to the alternative road (based on survey data)

Positive	% of Respondents	Negative	% of Respondents
Reduction of traffic congestion	44%	Limited population around city	9%
Improvement of business economy	6%	Increase in road accidents	2%
Ease of access to institutions	3%	Reduction of business community	3%
Reduction of road accidents	4%	No significant change	10%
New shops and hotels along road	11%		
Increase in land prices	1%		
Urban beautification	3%		
Ease of commuting	4%		
Total	77%	Total	23%

Both survey experience and data analysis reveal that nearly half of all responses relate to the reduction of traffic congestion as a result of the alternative road, with 44% of responses pertaining specifically to this aspect. Closely related responses include the reduction of road accidents and the improvement of commuting, each accounting for 4% of responses. Accordingly, 8% of respondents indirectly report a positive urban change through improvements to road infrastructure, and overall, a majority of 52% of responses indicate that a degree of sustainability in road traffic has been achieved.

Several responses further indicate that the alternative road has opened new urban economic opportunities. A total of 11% of responses report the establishment of new shops and hotels along the alternative road, a finding corroborated by survey experience. Complementing this, 6% of responses attest to the creation of a more favourable environment for business operators. Accordingly, 17% of responses directly acknowledge a positive impact on the urban economy.

With regard to urban structure and beautification, a modest 3% of responses indicate that the alternative road has contributed to urban beautification, offering some insight into the aesthetic dimension of urban infrastructure development. Conversely, a notable 10% of responses indicate that no urban change has occurred, reflecting a perception of urban stagnation. Overall, the total response categories may be broadly classified as positive and negative with respect to the urban changes brought about by the alternative road, enabling the derivation of a cumulative value. The table above presents this classification along with the resulting cumulative values. Accordingly, a majority of 77% of responses expressed positive views regarding the urban changes brought about by the alternative road.

5 Discussion

Based on survey experience, individuals operating along the old main road were largely less affected by the economic impact of the alternative road, primarily because the old main road remains a densely populated area with a high level of urban economic activity. Consequently, these individuals are less sensitive to the economic shifts generated by the alternative road (Montgomery, n.d.). The primary reason for this is that shopkeepers, daily service providers, and similar stakeholders have been directly affected in terms of demand, owing to a reduction in traffic along the old road (Hesse & Rodrigue, 2004; Watson, 2009). For instance, a fuel station owner noted that demand at his station had declined due to the establishment of a new fuel station along the alternative road (Hesse & Rodrigue, 2004). This situation is further corroborated by 8% of responses that directly reported a reduction in the number of customers visiting for services, reflecting a contraction in the service economy. Those who responded most favourably attributed this primarily to the reduction in traffic congestion brought about by the alternative road. Responses citing reduced fuel consumption, unobstructed roads, improved time management, and easier access to workplaces further confirm the economic efficiency generated through congestion reduction.

The relative economic contraction observed in the older parts of the city, and partly to a pre-existing negative perception, noted through survey experience, whereby government infrastructure projects are regarded as undertaken primarily for corrupt purposes rather than for genuine public benefit. The majority of 60% of respondents expressed negative views regarding the economic changes, indicating that urban residents have developed a predominantly negative perception rather than a positive economic outlook with respect to the alternative road as an urban planning intervention. The awareness of urban citizens regarding urban planning is of critical importance for achieving intended outcomes (Fainstein & DeFilippis, 2016). However, the negative attitudes reflected in responses indicating either no impact or an adverse economic effect reveal the limited engagement of the public with the development planning process. In many instances, the contraction of services and other activities along the old Kandy road, as a consequence of the alternative road, appears to have contributed to the predominantly negative perception held by the majority.

The study indicates that urban residents hold a predominantly positive perception of the alternative road as an urban planning intervention or factor of urban change. The predominant alignment of responses with this view suggests that the expansion of infrastructure capacity through the alternative road has alleviated urban pressure. However, this proportion is insufficient to constitute a significant consensus regarding urban beautification as a notable outcome of the intervention. Survey experience confirmed that this situation may be attributed to the limited engagement of the public with the development process. In particular, a degree of public awareness regarding a development project is essential for its overall success (Fainstein & DeFilippis, 2016; Harvey, 2008; Watson, 2009). Negative responses were also observed, including reports of increased road accidents, a reduction in the business community, and a decline in the number of people visiting the city.

There is a divergence between negative economic perceptions (60%) and positive urban perceptions (77%). It reveals a nuanced community response to the alternative road. The contraction of economic activity along the old Colombo–Kandy road, resulting from reduced vehicular traffic. It has generated a predominantly negative economic outlook among traders. It has an impact on service providers operating within the established commercial corridor. This finding is consistent with the broader literature on the redistributive economic effects of road bypass infrastructure (Fröidh & Byström, 2013; Fröidh & Nelldal, 2015; Hesse & Rodrigue, 2004). New routes divert economic activity away from established commercial areas. On the other hand, it is simultaneously generating new opportunities along the alternative alignment. This divergence condition can be observed in the study area. The strongly positive urban perception, driven primarily by traffic congestion reduction, reflects the accumulated urban pressure experienced by Kegalle residents prior to the construction of the alternative road. The 10% of responses indicating no urban change, and the limited public awareness of the

planning rationale behind the project, underscore the critical importance of community engagement and public communication in urban infrastructure development.

6 Conclusions and Recommendations

This study contributes to the growing body of literature on community perceptions of urban infrastructure interventions in secondary cities of the Global South. This offers empirical evidence from the Sri Lankan context that bridges the gap between top-down urban planning rationales with grassroots community responses. The central theoretical contribution of the study lies in its demonstration that a single infrastructure intervention can simultaneously generate divergent socio-economic outcomes. Across the same segments of the urban population, there are different ideas in different urban aspects like economy and urban change. This finding challenges linear assumptions of infrastructure-led urban development. Specifically, the co-existence of negative economic perceptions (60%) among established commercial corridors. Positive urban perceptions (77%) among the broader resident population of Kegalle reveal the inherently redistributive nature of road bypass infrastructure. Fröidh & Byström (2013) explain that consistent with the redistributive economic effects documented in the international literature. This divergence has direct implications for how urban planners and policymakers think in Sri Lanka.

The study further reviews that multi-criteria analysis constitutes an indispensable spatial planning tool in the Sri Lankan urban governance context. This is evidenced by the expansion of the Mawanella planning boundary from 4.7 km² to 119 km². It enabled a more systematic identification of Mawanella. Mainly, it supports identifying development potential zones, environmentally sensitive areas, and disaster-risk territories in the study area. This finding reinforces the value of integrating GIS-based spatial analysis into the planning. Basically, the early stages of urban plan preparation are particularly for rapidly urbanizing secondary cities operating under resource constraints.

The recommendations can be presented with each grounded in the empirical evidence of this study. The most urgent recommendation is supported by the finding that 10% of respondents reported no urban change. A significant proportion attributed negative perceptions to distrust of government intentions. It raises concerns about the establishment of structured public communication and community engagement mechanisms before and during infrastructure project implementation. Participatory planning processes that transparently articulate the planning rationale in these situations. Therefore, projected benefits and timelines of infrastructure interventions are essential for generating informed community consent. It helps to reduce perception-driven resistance as well (Arnstein, 1969).

Second, 20% of respondents reported a direct negative economic impact. Moreover, 8% identified a specific reduction in service sector customers. Targeted economic transition support programmes should be developed for traders and service providers. The

infrastructure development has been adversely affected by traffic redistribution along the old Colombo-Kandy road. Such programmes may include temporary rate relief. Business relocation incentives, or the designation of a commercial revitalization zone along the old road corridor, can empower these communities.

Third, the substantial tourism, agricultural, and administrative potentials were identified in both Kegalle and Mawanella. The potentials should be systematically operationalized through dedicated sectoral strategies. The sectoral strategies should be embedded within their respective urban development plans. It would be better than remaining as aspirational potentials. In particular, the 29 archaeological sites within the Mawanella planning boundary. The city's position within three converging tourism zones represents underutilized assets that require targeted investment in supporting infrastructure. A systematic project to attract investment and catalyze the potential of the towns.

Finally, the critical environmental and disaster risk challenges were identified in Mawanella. It includes 54% landslide-prone land area, 15% of risk zones occupied by human settlements, and the loss of 4% of green cover between 2000 and 2020. It raises the necessity of the immediate integration of risk-sensitive land use planning and heritage conservation frameworks into the urban planning process. Future research employing longitudinal methodologies would further strengthen the evidence base decision making in the cities. They would empower the assessment of the long-term socio-economic impacts of alternative road infrastructure on secondary cities in Sri Lanka. Especially, in the Kegalle and Mawanella contexts, future research directions from this study should be addressed, contributing to the new knowledge, supporting the building of a modernized and futuristic plan for the study area.

7 Reference

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