

CARING NEIGHBOURHOODS IN MANAGING CITIES FOR TRANSFORMING FUTURES

Jeeva Wijesundara^{1*}, U.G.D Weerasinghe, Ranjith Perera

Department of Architecture, University of Moratuwa, Sri Lanka

Abstract

City performance ensures references to the spatial form of the city or any built environment as places for people. The quality of a place is a result of the combined effect of place and society that inhabits in it. In managing cities, it is important to understand behavior of different social groups reflected in urban formation and transformation. Several performance dimensions are identified in Good City forms; it should be vital, sensible, well fitted, accessible, well controlled and all of these are achieved with integrity and internal efficiency. They are the collective experience of urban form of a city; at local community space levels, giving birth to neighbourhood sustainability. As an important concept in Planning and Architecture, Sustainability has become vital in contemplation of cities. In the development of neighbourhoods, it has received lesser attention particularly in the context of developing countries for some reason. However, cities cannot be considered sustainable and cared, if constituent neighbourhoods, do not meet sustainability measures. It is clear that the urban form of a city is constantly facing to challenges in transforming into futures, and therefore, should withstand to impending social, environmental and economic requirements of the neighbourhoods; where people live in and work at. This paper attempts to discover the sustainable identity of a selected residential neighbourhood in Colombo inner city limits as a case sample, to recognize its determinant factors in design formation. Further it investigates the means of improving and maintaining them, to be preserved as long lasting, great urban neighbourhoods. This will address the essentials in caring such urban neighbourhoods as distinctive living entities, which are momentous constituents of changing city.

Keywords: Urban form, sustainability, neighbourhoods, neighbourhood sustainability

Introduction

In managing cities, caring of its form is vital in upholding sustainability. Cities can be considered sustainable and cared only if they appeal its inhabitants. A City in its transformation to futures, consistently facing up to challenges, (UNGE, 2018) should be sufficiently capable of responding to

* Corresponding Author: Jeeva Wijesundara; E-mail- jeevawijesundara@yahoo.com

forthcoming social, environmental and economic needs of its constituent neighbourhoods that are confined human living entities.

In the context of city, the urban form as its physical manifestation (Dempsey, 2010), demonstrates physical patterns, layouts and structures of designs, which defines the physical character of its constituent neighborhoods and communities. Overall, the urban form of a city or neighbourhood are constituted and configured of a set of elements, which could be identified as streets, street blocks, plots, buildings, open spaces and architectural aesthetics. These configurations with specific qualitative and quantitative measures, originates an identifiable character, unique to each and every neighbourhood at local level and consequently, city in a broader context.

'Neighborhoods', as inspiring local communities, always possess a strong physical authenticity within cities retaining uniquely identifiable physical, social and economic characteristics. As key 'unit' of city, neighbourhoods embrace a significant role in city formation and development. Elements and composition of such formation or the urban form of a neighbourhood are identified as key factors that are appealing to stimulate sustainability and human behavior, which demonstrate its distinctive identity.

Though most Sri Lankan urban and suburban neighbourhoods are generally not planned exactly at master contexts, the upcoming new developments and improvements on existing developments are to be handled sensibly, based on new knowledge and past experience with sustainable examples and their planning policies. Since local authorities are currently keen on the sustainable cities and related issues, researching the attributes of urban form in creating sustainable neighbourhoods and assessing them within its environmental, social and economic parameters are vigorous.

Residential developments are of mainly subdivisions, piecemeal or master planned in developing country contexts. In any of these circumstances, the neighbourhood form as one entity holds a significant place in dignifying the sustainability of the area. Sustainability of neighbourhoods demonstrated by its urban form fosters the overall sustainability of a city (Choguill, 2008), and therefore, caring neighbourhoods is profound in caring cities. Succeeding sustainable cities has become a vigorous approach worldwide in conventional neighbourhood planning and development (Dehghanmongabadi et al., 2014). The development of residential neighbourhoods, which represents an important constituent component of urban land use at local level specifically in urban context, is increasingly influenced by the concept of sustainability.

This study intends stamping a definition to 'sustainable neighbourhood' operationalizing and illustrating key elements and attributes of its 'urban form', which are fundamentally affective in creating sustainable neighbourhood. The research methodology is mainly concentrated on empirical survey grounded on a sample residential neighbourhood from Colombo inner city. It examines the sustainable topographies of neighbourhoods, qualitative as well as quantitative attributes of respective urban form that regulates sustainable character of an urban residential neighbourhood. It scrutinizes the impending requirements of its urban form that attempted to maintain unique identifiable characters as sustainable neighbourhoods; long lasting 'great' neighbourhoods in human perception within the context of changing city.

Research Problem Statement

In caring cities, the notion of sustainable communities and the associated ideas of livable neighbourhoods initiate several stimulating explorations. It provides a number of pointers when focusing on to the realistic neighbourhoods and communities of which people are a part, and that

they engage with. In this milieu, careful attention at neighbourhood level is essential to maintain sustainability, since those community parcels, facing the challenges of constant changes in the urbanity. How the sustainable character could be maintained in the changing form of urban neighbourhoods?

Research Objective

Specific Objectives of the research are, investigating sustainability features; the indicators as perceived and experienced by users under three main sustainability parameters; environmental, social and economic, to develop a theoretical frame-work for assessing Neighbourhood Sustainability in terms of Urban Form. The final objective will be formulating; verbalizing the sustainability determinants of Urban Form as 'the physical indicator' of the sustainability. The mode that sustainability assessment would diverge with the varying attributes of urban form in the case will be analyzed. Aim is to set principles for maintaining and improving the conditions of existing urban neighbourhood, to be fitting with urban transformation, which is the utilitarian importance that could be adopted into policy decisions.

Literature review

Urban Form:

Urban forms simply describe the physical formation and characteristics of a built environment. That may encourage and establish the fact of neighbourhood sustainability, amicably with the social, environmental and economic factors, possessing the potential to create areas safe and secured, user-friendly, convenient, crime preventive and long lasting. The term 'urban form' describes city's physical characteristics (Dempsey, 2010) and it generally embraces a particular set of physical features and nonphysical characteristics including size, shape, scale, density, and land use distribution (Kotharkar, 2014). Further it considers housing and other building types, urban block layout and dissemination of open or green space (Dempsey, 2010). Overall, it is a combination of a multitude of characteristics, which includes transportation infra structure and urban design features of the city (Jenks, 2010). Connectivity through built form and transportation infra-structure contributes immensely to urban form influencing quality of place. These are comprehensively categorized by Dempsey (2010) as density, land-use, accessibility, layout and building character, as inter-related elements that structure the urban form in a particular city.

As a spatial composition of reappearing elements, Urban Form takes lead to the sustainability of cities (Jabareen, 2011), once grounded on certain sustainable concepts. Accordingly, characteristics could vary from, a much localized scale, with features such as building profile, colours, materials and façade details, to, a broader scale; with housing or building type, street type, spatial arrangement, blocks and layout. Spatial configuration, therefore, not only creates hierarchical relationships, but it also helps producing particular patterns of social relationships (Bafna, 2003) and behavior within the community. As per Lynch (1960) the form is rather noncommittal, plastic to the purposes and perceptions of its inhabitants. There are fundamental functions of which the city forms may be expressive; circulation, major land uses, key focal points. If the environment is visibly organized and sharply identified, the citizen can notify it with his own meaning and connections. Then it becomes a true place, remarkable and unmistakable.

Understanding Neighbourhood:

Neighbourhoods are the utmost-local communities of human habitat. Inhabitants sense that they intuitively realize what a 'good neighbourhood' mean, with the degree of neighbourly interactions; mutual support, gathering places and appealing environment, or in a 'bad neighbourhood'; danger, anti-social interaction, exclusiveness, isolation, and dereliction (TYF, 2010). For understanding neighbourhood, mainly two models were found as dominate. One is mainly concerned with administrative geography, and the other, is focused on mental maps and subjective identifications.

1. **Administrative Geography:** The ward is often considered as a key unit of area in establishing and maintaining any neighbourhood arrangements. The ward is not defined as the neighbourhood; a ward might be the neighbourhood, or else, it could be either part of a ward or an area consisting of several wards, depending on the case.
2. **Self-defined community:** It is focused on an area that residents consider specifically as their neighbourhood for certain issues and events. In this approach, neighbourhood is essentially self-defined by the people who live in them (TYF, 2010).

Technically, Neighbourhood is the immediate geographical area surrounding a family's place of residence, bounded by physical features of the environment. As a community parcel it emerged as a concrete urban component, and is constantly a part of a larger whole and, more importantly a system in itself, having its own definite mechanisms and functions (Kullus, 2000). But rich descriptions of what neighbourhood means, are combined with a variety of physical and social characteristics. Development of social contacts among neighbours (Momoud, & Tassinary, 2004) is an important concern in neighbourhood context. It has been argued that increasing relationships outside the neighbourhood loses the local neighbourhood social ties. This was affected by problems such as safety, density, crowdedness, proximity, traffic volume and lack of homogeneity of inhabitants' life-style, life-cycle and background (Appleyard & Lintell, 1972). However proximal neighbourhoods hold an important place in peoples' lives, (Unger & Wandermann, 1985) and it is a social as well as spatial phenomenon, which connects people themselves with their immediate surrounding community.

Neighbourhood Sustainability Concept:

As per the definition by Beauregard (2003) 'sustainability' is sited at the intersection of environmental responsiveness, economic progress, and social integrity. Similarly, 'sustainable design' is explained by Kotagama, (2019) as the art of designing the built environment to conform with the ideologies of economic, social and ecological sustainability, incorporating sustainable planning; cities and infra-structure, architecture, landscape, agriculture and technology. Sustainable development ties together with the concerns for carrying capacity of natural systems with the social challenges facing humanity (Bombugala, 2010). Accordingly, if the form enables the city to function with its natural and man-made carrying capacities, user friendly, and safe for its occupants, and promotes social equity, to be considered sustainable (Williams, 2000). The meaning of sustainable development in general understanding is the balance of social, economic and environmental requirements (SOC, 2010) linked appropriately with prevailing urban development measures. To maintain the link- balance, the changes in development should be socially equitable, environmentally bearable and economically viable (Bombugala, 2010). For realization of this link, the inclusive Governance; in terms of managerial dimension, establishment of policies, proper implementation and continuous monitoring is essential, regardless of the scale

of development. These are within possible and practical parameters for design professionals, as long as strategic and appropriate policy making is positively involved.

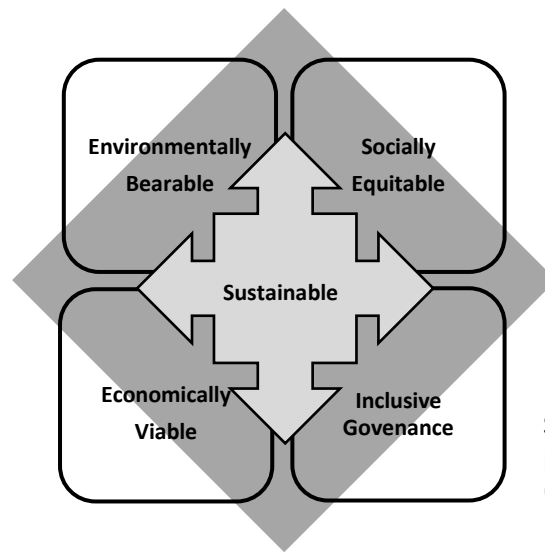


Figure-1: Major Inter-connected Sustainability Parameters and potentialities (Author's interpretation; Bombugala, 2010)

Concept of neighbourhood sustainability has different forms and definitions. Aim of sustainable urban development must be to produce 'user friendly' and 'resourceful' urbanities, in terms of its form and energy-efficiency, as well as its function, as a good place for living (Elkin et al., 1991). A sustainable neighbourhood has value as a place to live over several generations (Falk & Carley, 2012) simply long lasting. It is generally examined and agreed that how the innovative communities were designed and physically laid out. Accordingly, Falk and Carely (2012) have conveyed the conclusions composed into four themes as; healthier and stronger communities, secured, safer streets and living places, a greater choice of homes, environmental conditions and features adding value to living in a good neighbourhood.

Sustainable Neighbourhood forms:

The role of the urban form in creating sustainable neighbourhoods, has become more prominent in urban neighbourhoods, due to the rapid growth in urban population and urban sprawl. Looking at the US traditional neighbourhood pattern, Duany, Plater-Zyberk and Jeff (2000) suggest six fundamental rules that have been around for centuries. It has been provided a fully valid framework for the design and redesign of their communities. Main concerns are on the neighbourhood center, five minute walk to needs of life, street network with good connectivity, narrow- versatile streets that traffic can be shared and smaller streets and boulevards, mix of uses, special sites for community functions such as civic buildings; libraries, schools, town and city halls, and places of worship.

Neighbourhood forms are designated as successful when they strengthen the functioning of prevailing urban systems, consume resources sustainably, and deliver a comprehensive economic base, enabling a 'good quality of life' for its inhabitants. Also, they are capable in withstanding shocks of changes (UNGA, 2018), and are able to bounce-back or advance their conditions within the situation (RTPI, 2015); simply are 'long lasting'. The shocks could be mostly environmental, economic or social related; shrinking, densification, peak energy and climate catastrophes.

In particular, LEED-ND (Leadership in Energy and Environmental Design-Neighbourhood Development) as a neighbourhood rating system, contains a set of measurable standards that is

collectively used to identify a development or proposed development in terms of its environmental superiority, location and access, internal pattern and design, and application of green technology and construction techniques (Welch et al, 2010). In summary, all credits and prerequisites in the LEED-ND Rating's Systems could be stated in an informal checklist;

Table-1: Sustainability Check list summarizing credits and Prerequisites in LEED-ND
Source: Welches, et al, 2010, A Citizen's Guide to LEED for Neighborhood Development, (p.23)

Smart Location and Linkage	Neighborhood Pattern and Design	Green Infrastructure and Buildings
Location	Walkable Streets	Construction Techniques
Ecosystems and Open Spaces	Compact Development	Energy Efficiency and Conservation
Contaminated Sites	Neighborhood Connections	Energy Production and Distribution
Transit-Accessible Locations	Mixed Uses	Water Efficiency and Conservation
Cycling Facilities	Affordable and Diverse Housing	Storm water and Wastewater
Jobs and Housing Proximity	Parking and Transportation Demand	Green Building Process
	Parks and Recreation	Historic and Existing Building Reuse
	Universal Design	Heat Islands
	Community Participation	Recycling and Reuse
	Local Food	Light Pollution
	School Access and Design	

To persuade more sustainable communities or neighbourhoods, it needs to explore the requisites and qualities that assemble them enduring livable, and reinvigorate areas. It is essential that sustainable communities are to be understood as places where people desire to live in and work at, now and in the future (Bruntland, 1987). Places and spaces are created by the elemental formation of the neighbourhood; simply the 'urban form'. They encounter the diverse needs of present and future residents that are sensitive to their living or working environment, and contribute to enjoy a good quality of life. In human perception, they are safe and inclusive, well planned, assembled, built and function, and offer equality of opportunity and good services for residents (City of Pickering, 2011, AARP, 2005). For neighbourhood communities to be sustainable, it asserted that they must offer decent and affordable homes, good public transport, walkable streets, public facilities and amenities such as schools, hospitals, shops, community spaces, etc. in a clean and safe environment (AARP, 2005, Metlife, 2013). Those should be applicable to both new-planned as well as developing existing neighbourhoods, for them to be expressed as sustainable neighbourhoods. A livable community for all residents, senior citizens alike, would include elements that help to maintain independence and quality of life (AARP, 2005). The physical characteristics of a community possess a major attraction in facilitating personal independence of residents of all ages.

Accordingly, the sustainable neighbourhood is identified and recognized by its form. Lynch (1984), describes urban form in a diverse and a multi-featured manner. Overall spatial arrangement of human-social activities, consequential spatial flows and movements of people, goods, information, and the physical features would modify or amend space appropriately in particular way significant to those actions, including enclosures, surfaces, channels, ambiances, and objects (Lynch, 1984). This comprehensive explanation of urban form exemplifies social, cultural, economic, political, and physical realms of urban life (Beske, 2012). Therefore, the urban form with its dimensions or the features is diverse realms in which the sustainability is stamped upon.

Concluding, the neighbourhood formation coinciding with sustainability concepts is the fact for the inhabitants to feel them as 'great' neighbourhoods. Centered to this broadly applicable definitions and discussions, at the neighbourhood scale, sustainable development is a habitation that facilitating peoples' living today, and in the future; socially, environmentally and economically healthy; safe, well planned and built to last long. They are visually pleasing, aesthetically appealing, conveniently functioning and overall a user-friendly community environment. Briefly, Sustainable Neighbourhoods are fit-to-user, safe and long lasting. Sustainability measures are evident in its negative, moderate or positive form in any neighbourhood, which could be qualitatively dignified. Arguably, the neighbourhood formation, could be analyzed and measured in terms of its constituent elements, and its composition or the physical configuration could be structured. Parallel, both facts on actual data would create a model structure for sustainable urban form for particular neighbourhood.

Research Methodology

Human perception; how they sense it, and its' changes, is the most important consequence of the built environment at any of its resolution. As Lynch (1984) states, the degree to which the settlement can be evidently perceived, mentally distinguished and structured in time and space by its residents, is the sense of place. In researching, phenomenological inquiry in both architectural and environmental behavior, it can be realized that there is also a growing body of qualitative, descriptive research focusing on actual places, built environments, and environmental experiences (Seamon and Mugerauer, 1985). Appropriate sampling to best portray the research problem is centralized in the research design. The research is to be naturalistic and observational for understanding the successes and failures in urban form and its' compassion with resulted sustainable identity of such neighbourhoods. It is essential to involve up-close, in-depth and detailed examinations on subject study based on specific contextual conditions. Therefore, case study method is chosen as the stratagem, as opportunities are to be made available for real aspects of problems to study in-depth within a pre-planned time search.

The research is designed with three key steps based on the case neighbourhood. Initially, it is focused to understand the urban form technically with its components; density, housing and building type, architectural character, layout, connectivity, transport infra-structure, and land use. Secondly, the levels and background of neighbourhood sustainability is examined realistically in the perception of its inhabitants. Finally it is concluding on the determinants of urban form rationalizing the sustainability goals of the neighbourhood.

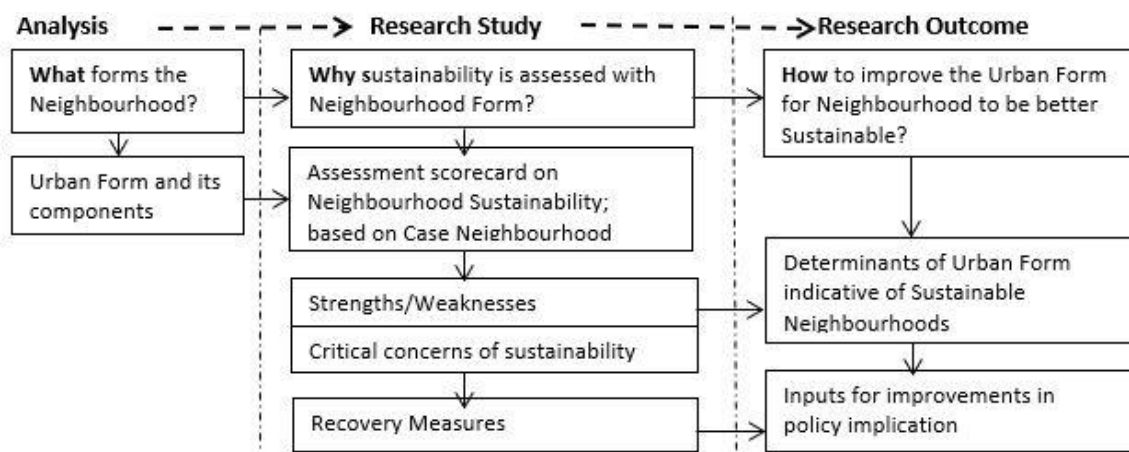


Chart 1: Structure of the research process (Source Author)

Based on the sustainability criteria found in literature review, current neighbourhood environment will be studied for the purpose of understanding sustainability indicators in Human Perception and Behaviour. These are laid under each of neighbourhood sustainability category; within Social, Environmental and Economic parameters, which are strongly inter-connected and possibly could not be assessed separate. However the variables are formed under each parameter and for evaluation purposes, following criteria is being applied;

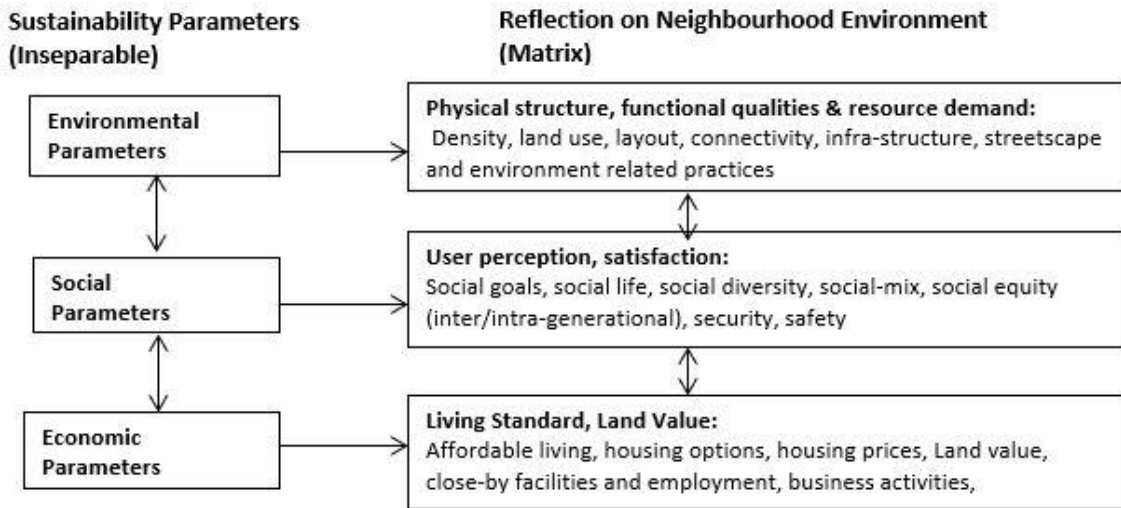


Chart 2 : Conceptual framework outlining the neighbourhood sustainability (Source Author)

Considering the real living situations, a set of queries are formed to understand the overall sustainability of the neighbourhood. However, conceptually those queries were categorized under main three sustainability parameters and their respective qualitative output. Research unit would be the household; 30 numbers random samples and the questions on sustainability perception will be answered by the head person of each household. Questions are well structured and the answers are recorded in Likert scale as very poor (1), poor (2), moderate (3), good (4) and very good (5).

In the analysis of data, the indicators of overall urban form, resulting particular identity for its inhabitants as users, to feel them as a great neighbourhood is to be understood. More importantly, how far the inhabitants have perceived the identity of their neighbourhood as a great place is the question answered. With the results, the contributory factors of urban form responsible in resulted character could be established. The strengths and weaknesses identified and how they have transformed into physical form are to be harmonized. Changes to be made in the urban form in fixing them is the final moderation, which is to be used as tools in application for maintenance and improvements.

Limitations

Case study is a selected neighbourhood development from Colombo inner city as a prototype of planned urban neighbourhood which was lasted for more than 80 years. Boundaries were confined as a self-defined vibrant community model; an exemplary case in concentrated development zone in Colombo.

Table 2: Design frame-work of Questionnaire

Parameter	Matrix	Indicator based question
Environmental	Physical structure,	⊕ Movement and interaction patterns
		⊕ Distribution of land use and transportation patterns
		⊕ Adaptability of environments to transit/pedestrians/bicyclists
		⊕ Street experience, Streetscape
		⊕ Appropriateness/ adequacy of street connectivity
		⊕ Convenience levels of Street rout directions
		⊕ Streets convenience , street safety, light levels of streets
		⊕ Levels of Pedestrian Accessibilities
		⊕ Adequacy of Pedestrian net-work coverage
		⊕ Adequacy of Open space provisions
	Functional qualities,	⊕ Tree plantation, wind concerns, natural light/ventilation
		⊕ Residential dwelling density and population density
		⊕ Ecological sustainability; (observation)
		⊕ Functioning of Land uses and Mix diversity; (observation)
		⊕ Existence of Impervious surfaces; (observation)
		⊕ Manageability of Environmental issues in constant development
		⊕ Urban water system: adequacy of availability, usage, disposal
Resource demand	⊕ Energy usage: adequacy of availability, usage, natural systems	
	⊕ Air pollution and noise: health effects, stress conditions	
	⊕ Storm water management; disposal	
	⊕ Solid waste management; storage, disposal, recycling	
Social	User perception, Satisfaction	⊕ Users perception /rate their neighbourhood
		⊕ Concern on the kind of diminished experience of a good living
		⊕ Association of social pattern and behavior within neighbourhood?
		⊕ Representation of inhabitants' interests (or ignored)
		⊕ Existence of stronger community Identity and sense of place
		⊕ Existence/facilitation of Identities for culturally diverse communities
		⊕ Convenience for older community to live and move
		⊕ Collective contribution of housing/building characteristics to an identity
		⊕ Easy accessibility to schools, public transport, recreational areas, health services, community services, emergency services, places of worship
		⊕ Levels of Crime prevention measures, security, road safety, street light
		⊕ Availability of sufficient traffic calming precautions
		⊕ Diversity/variety of Housing quality
		⊕ Demonstration/Expression of Cultural identity
		⊕ Sufficiency/availability of dedicated facilities; childcare centers, community centers, public libraries, skills development facilities
		⊕ Facilitation of Non-motorized transport
		⊕ Harmonization of planning/engineering standard with life-styles
		⊕ Encouragements/supports with public environment, public life of community

Economic	Living Standard	<ul style="list-style-type: none"> ⊕ Availability of commercial establishments in proximity ⊕ Acceptability /Convenience of connectivity ⊕ Diversity of housing types ⊕ Affordability of housing options ⊕ House prices, Land values ⊕ Availability of employment opportunities, types, possibility ⊕ Standard of living quality, buying power, equity
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Presentation and Analysis of data

The neighbourhood considered as the case study for the research is Newham Square, in Kochchikade- north GN division, located within concentrated development zone in Colombo Municipality. A detailed analysis on its urban form and sustainability level based on human perception is revealed, by research oriented observations and interviews, at the conclusion of which, a rationale for sustainability level in terms of urban form is established.

Introduction to Case Neighbourhood

Newham Square neighbourhood, is a vibrant multi-racial and multi religious community situated close to well-known St. Anthony's Church and Jampettah Street, accessed by Ratnams road, close to harbour wall in North Colombo, within the concentrated development zone. By its location, formation and inherent architectural character, the neighbourhood has become an attractive and striking urban community in the existing urban fabric.

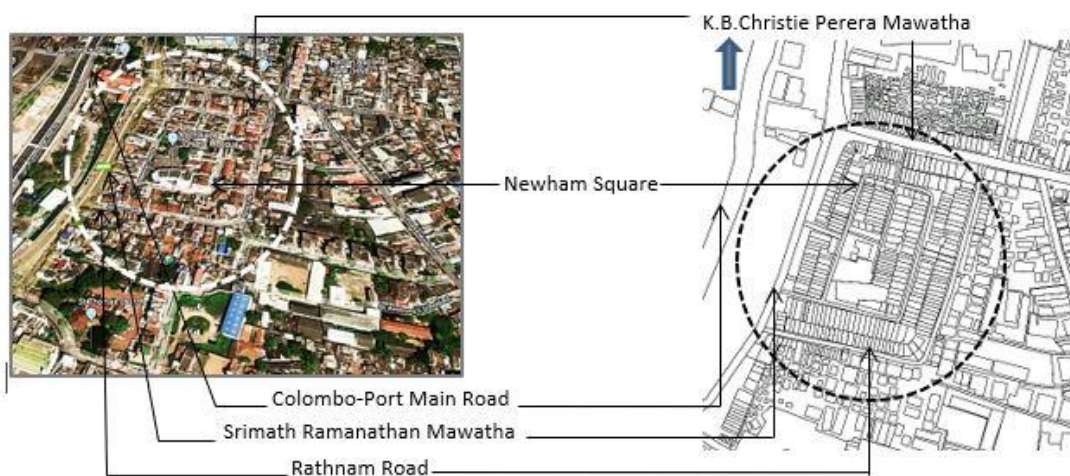


Figure-2: Physical location of Newham Square Neighbourhood; Sources; GIS (UDA), www.google.com

The neighbourhood is bounded by two parallel roads; Colombo Port Main Road and Srimath Ramanathan Mawatha on west, K.B. Christie Perera Mawatha on north and Ratnam Road on east and south. This neighbourhood with a unique identity was said to have been built before independence period, dating back to 1930, by the British government to settle the working labourers of Colombo harbour. With a total population of 9,333 within the entire Kochchikade North GN division, Newham square neighbourhood is the most dense, planned residential neighbourhood area. Based on the census and statistics, out of the total population, 54% is male and female count is 46%, whereas employed and economically active group is considered as 50% (Dept. of Census & Statistics, 2012). Considering the proportionate distribution of age group

categories, child population is lower than the middle age group; the elderly and senior-citizen population is proportionately very low in the area.

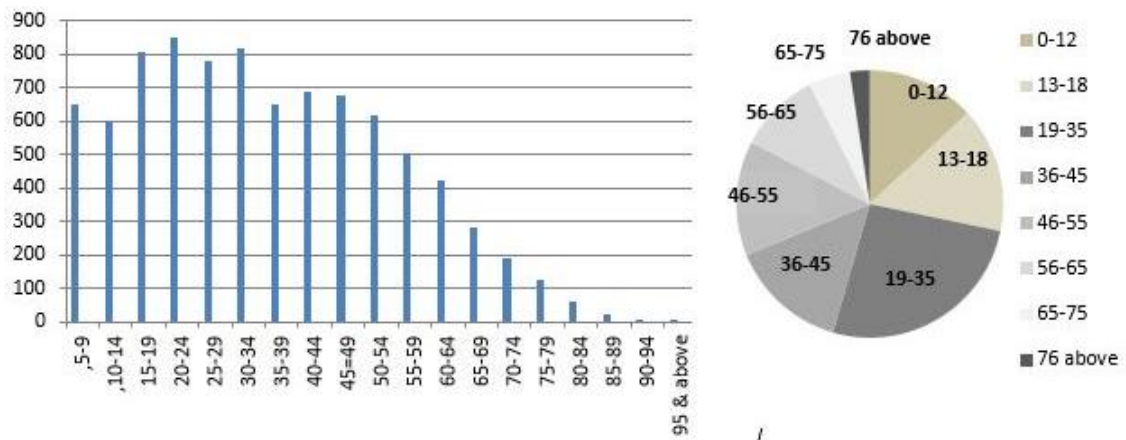


Figure-3; Population by Age (years) in Kochchikade North GN Division
 Sources: Department of Census & Statistics

Investigation and Analysis of Urban Form

Density

As a neighbourhood located within a concentrated development zone in the main business city, both housing and resident density is comparatively very high in the neighbourhood. Within the considered area of the neighbourhood, nearly 85% of the area is built, and 70% are found as residential buildings. Residential density of the considered area is 125 households per hectare and the population density is nearly 600 persons per hectare. In overall Kochchikade North GN division, the population density is nearly 485 persons per hectare. Hence, it is obvious that the case neighbourhood holds a high density of housing and residents, when compared with the overall GN division. This is a respectable prototype for high dense neighbourhoods, which shares common urban facilities amongst larger group of urban residents. A planning strategy in achieving high density is minimization of plot size and foot print. The number of floors is limited, economizing building structures.

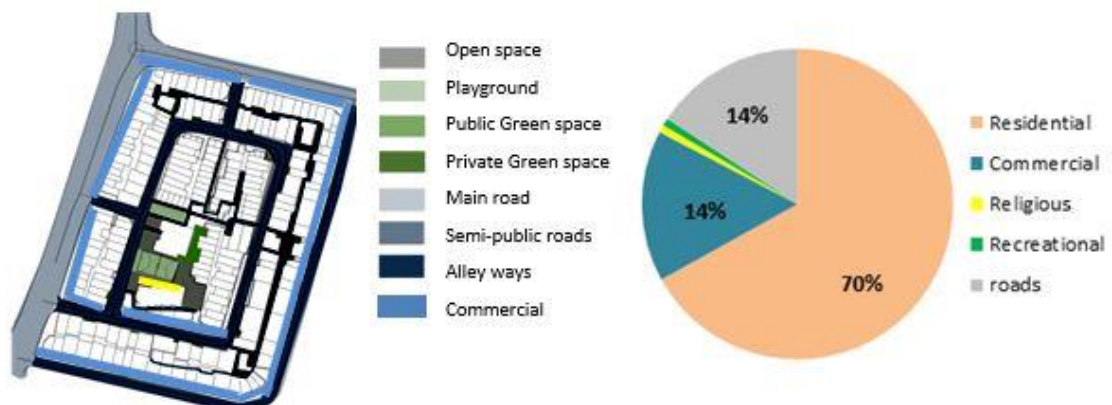


Figure- 4; Land use within neighbourhood
 Sources; GIS (UDA), physical observations

Private Green space or garden is minimized, enabling community sharing of open spaces within the neighbourhood. Public open space and community spaces are centralized but limited. Edging to the main arterial roads and direct connecting roads, commercial establishments are emanated, facilitating the day-to-day shopping activities of residents. It provides the close by employment to a certain extent.

Layout, Connectivity and Transport infrastructure

Lay out of the neighbourhood is compact, quite simple, with outer main arterial roads, and inner semi-public road (Newham Square), accompanied by pedestrian alleyways. Every house block possesses a narrow road frontage and accessible directly from the road at ground level. Upper level housing has entrance from upper level corridors on opposite road side, which is the alleyway side. Private garden spaces are extremely limited, but tiny landscape patches are visible in most house fronts.



Figure-5: Layout, connectivity
Source: Author

Internal streets are narrow and do not contain separate or designated pedestrian space. Parking is on the road which is used as an extended part of the residents' living space at front. This made the road a common community space in the neighbourhood. Rear space of residences forms a narrow alleyway common to pedestrians, which is unique to the neighbourhood. Narrow entryways from main arterial roads to alleyways are special features, forming shared community spaces.

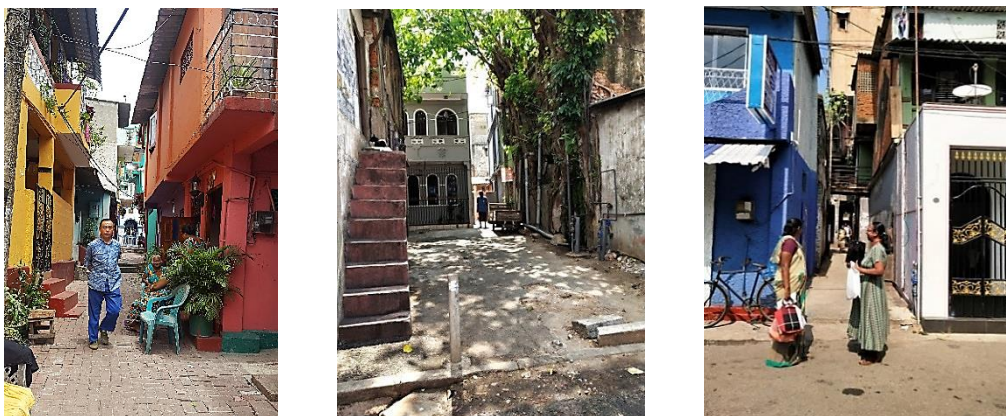


Figure-6: Narrow entryways from main arterial roads to Alleyways; Source Author

The neighbourhood layout demonstrates a highly respectable level of connectivity within the neighbourhood itself as well as with the surrounding urban context. In the spatial arrangement in macro context, it can be observed that the transportation nodes, commercial centers, schools, health centers, community areas, and religious centers are in close proximity. Effectively, all amenities required for living, including shopping, education and travelling are available within 500-1000 meters radius.

Each Private and every household of the neighbourhood itself is well connected to its immediate surrounding context by public roads, semipublic roads and alleyways. Within the neighbourhood, pedestrians are prioritized. Though pedestrian pavements are not provided on internal semipublic roads, they are transformed into pedestrian spaces within the neighbourhood community. Public transportation is mostly in use and private vehicle usage is minimized.

Housing and Building Type

Narrow road frontages and tight building plot arrangement are significantly identifiable, unique facets of the fabric, which creates a specific identity collectively with the pattern of low scale building heights. Bordering to the outer main arterial roads, building heights are comparatively high, mainly varying from two (02) to six (06) levels. Facing the inner roads, it varies from single height to four (04) storied. Most residential buildings are of two storied, and each unit is planned in one level. Ground level unit is entered directly from road and upper level houses are entered from common passage running at rear side above the alleyway.



Figure-7: Entrance stairways from road to upper level passage, above alleyway, and Passage creates the entrance to upper level houses; Source Author

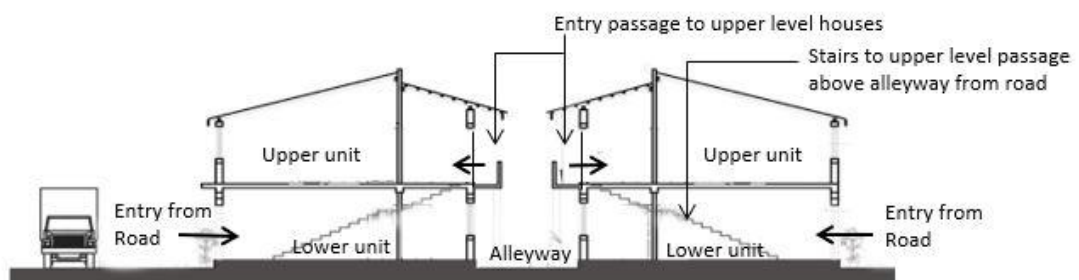


Figure-8: Concept of providing entrance from road to lower level houses, and from passage above alleyway to upper level houses; Source Author



Figure-9; Pattern of Building heights (Not to scale)/Sources; GIS (UDA), Physical Observations;
 Source Author

Architectural Character

Houses are densely placed, and are highly compacted. Old buildings of the area have followed a unique design but new renovations have added certain elements and made changes from time to time on the facades of the buildings. Some of the buildings have upper floors as new additions. Landscape features, façade colours, protective grill devices, and railings etc. expresses individuality of household. However, the changes are not architecturally much significant and it still stamps a unique identity and creates a significant character on the neighbourhood as a whole.



Figure-10; Unique architectural character as an urban neighbourhood , Well defined individual households, still a collective charisma on street façade; Source Author

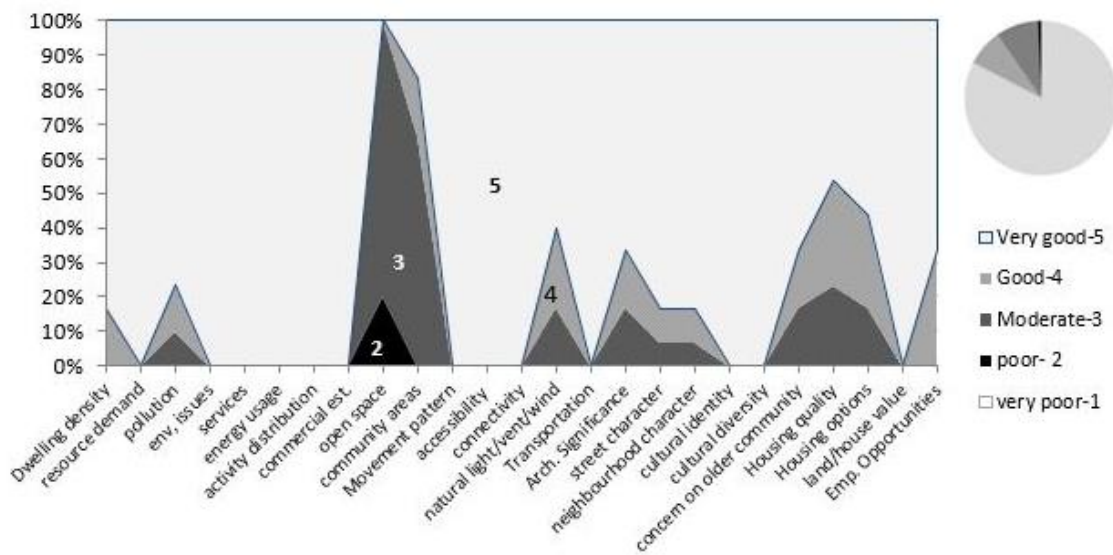
Most of the housing structures and facades carefully protect the unique architectural character of the neighbourhood collectively. It was convinced by the residents that the neighbourhood was long lasting for more than eighty (80) years by now with minor changes in the internal arrangements to be suited to the increasing interior space requirements. The houses are of permanent structures, and in general, walls are made out of brick, plastered and painted. Nearly 75% of the houses have cemented floors and the rest are finished with tiles which are recent renovations. Originally the houses had tile roofs, currently, 50% of them are replaced either with asbestos roofs or tile on asbestos roofs.

Analysis on Sustainability Assessment

The neighbourhood is assessed by the residents' perceptions as laid out in research design. Based on the data received from the inhabitants, open space provision is found at the poor-to-moderate level range, community space provision is at moderate, good and very good range, and overall other aspects of neighbourhood appeal is at very good range. Further, residents' concern on housing quality is an important observation, and natural light-ventilation provisions have references to pollution and health effects. Architectural; street and neighbourhood character has special concerns with the continuous changes in the urban setting. Research data are analyzed and tabulated as follows;

Attribute of Form	Research Matrix on sustainability parameter	User Perception-%				
		Very Poor-1	Poor-2	Moderate-3	Good-4	Very Good-5
Density	Dwelling density				16	84
	resource demand					100
	Pollution; air, water, noise, health effects			10	12	78
	Management of environmental issues					100
land-use	Facilitation of services					100
	energy usage					100
	activity distribution					100
	commercial establishments					100
	open space provision		20	80		
	community areas for all ages			66	17	17
Layout	Movement pattern					100
	accessibility					100
	connectivity					100
	natural light/ventilation/wind			16	24	60
transport infrastructure	Transportation availability, connectivity					100
	Convenience, adequacy of route direction					100
	Pedestrian Accessibilities					100
	Pedestrian net-work coverage					100
Housing/building character	Architectural Significance, appeal			16	16	68
	street character			06	10	84
	neighbourhood character			06	10	84
	Engineering standards			08	15	77
social goals	cultural identity					100
	cultural diversity					100
	concern on older community			16	16	68
	Housing quality			23	30	47
Economic factors	Housing options			16	26	58
	land/house value					100
	Affordability				30	70

Analysis of the data: Source Author



Every aspect considered on sustainability is assessed as perceived by the inhabitants, who are the living organs experiencing good and bad repercussions of their neighbourhood formation. It is very clear in the above diagram, that the residents accept their neighbourhood as appealing with minor exceptions.

Conclusion

Newham square neighborhood, which has been in existence for 80 years, is revealed as a long lasting neighborhood appealing to its inhabitants. Further, it is understood that a few modifications have been applied based on the changing requirements of the residents. However, it has been protecting its significant architectural and sustainable character so far, showing resilience to urban transformation. It is important to understand the necessity of the provision and improvements in urban living quality over the years. Specifically, the neighbourhood has a concentration of intrinsic architectural historic streetscape value with a strong urban character, which is worth preserving. From this research, the following points are highlighted based on sustainability concerns;

1. Lack of Open space provision
2. Lack of Community facilities in proximity
3. Declining Housing quality and engineering standards

Finally it can be concluded that, the levels of achievement in sustainability factors of an urban setting, are identified with the determinant attribute of its physical form. Land use issue in providing open spaces and community facilities in proximity is revealed as an important concern. Transportation is fundamentally important and the residents are well facilitated at highly satisfactory levels. Housing and building character is the architectural tool in creating an identifiable neighbourhood stamping it as a land mark. Housing option will not be possible to be enhanced in the particular case, but it is convinced that residents do not have high expectations. Housing quality is a fact that has to be continuously upgraded with periodical monitoring. It makes the way to maintain and enhance the quality of existing urban living setting as well as in any upcoming new housing developments at any socio-economic strata. It is worth paying attention to these as a policy implication in maintaining the sustainability of existing neighbourhoods; caring them in transforming into urban futures.

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