

Rajapaksha.Upendra, et al (eds), 2016, "Building the Future - sustainable and resilient environments": *Proceedings of the 9<sup>th</sup> International Conference of Faculty of Architecture Research Unit (FARU), University of Moratuwa, Sri Lanka, September 09-10, Colombo* pp. 288 – 303. ©

## DEFINING 'URBAN' AMONG URBANIZING RURAL: THE CASE OF SRI LANKAN URBANIZATION

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### Abstract:

The level of urbanization of a country or a region is generally measured in terms of the share of its urban population. Since there is no universal definition for 'urban', countries follow different approaches such as demographic, density, administrative, economic, morphological and functional, to define 'urban' in their contexts and Sri Lanka uses a pure administrative approach. Surprising trend of urbanization was observed in Sri Lanka with a drop from 21.5% in 1981 to 14.6% in 2001 and 18.2% in 2012. This was questionable as ripple effects of urbanization can be experienced all over the country. Disputes and confusions over the definitions of 'urban' are observed at International contexts. This research investigates this issue through a comprehensive review of existing definitions of 'urban' and respective scholarly works. Initial review of literature had found that definitions of 'urban' vary greatly between countries but usually they comprise of several criteria. This paper describes these findings on conventional approach and proposes an alternative framework to redefine 'urban' in Sri Lanka, by two principle approaches 'urbanism as a way of life' and the concept of 'urban society' resulted from a complete urbanization through a human centered approach. The results indicated the geographical representation of level of urbanization in Sri Lanka and it was quantified as 34%.

**Keywords:** *Urbanization, alternative framework, human centered*

### 1. Introduction

Human settlement systems have become so much complex as there are many interactions between different types of human settlements due to recent developments in transportation and information technology. Hugo, Champion, & Lattes (2001) stated that this has resulted many people dividing lives in between urban and rural areas. Therefore the clear distinction between urban and rural areas has become less clear-cut (Beer, et al., 2014). However the simple urban/rural dichotomy has long been recognised as an over simplification of the complexity of human settlements. Urbanization on the

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other hand is often defined as the growth of or migration to cities and thus measured in terms of the urban population growth. It is important for any country or state to learn their stand in the urbanization process and to identify their urbanization pattern and trends in order to take policy decisions whether to facilitate or control the urban growth.

In that context, the definition of 'urban' plays an important role in determining the urban status of a particular city or a state. Definitions of 'urban' vary greatly between countries, where single and multiple criteria methods are employed to define 'urban' depending on the contexts and there are many disputes over these definitions. In Sri Lanka surprisingly the trend of urbanization level, dropped from 21.5% in 1981 to 14.6% in 2001 and increased to 18.2% in 2012. This trend is questionable as ripple effects of urbanization can be experienced all over the country.

This research attempts to study these different definitions on 'urban' with respective to the principles behind and the major critiques drawn against them. After identifying the limitations in the existing definitions and the alternative perspectives on 'urban', this study attempted to develop a framework to evaluate the level of urbanization in Sri Lanka. Second chapter of the paper briefs the methodology and the research process. The third chapter present a summary on literature done on this while fourth section illustrates a situation review on urban definitions used in Sri Lanka from 1800 to present. The final section of the paper describes the proposed framework in detail and the application at national level.

## **2. Methodology**

This study basically adopts mixed approach of qualitative and quantitative methodology. In the first section of the study, qualitative approach was undertaken with documentary search as the primary method of data collection. It was intended to identify the knowledge gap in this research area. The existing definitions used for urban in Sri Lanka and worldwide are reviewed with strong emphasis on the underneath principles of these definitions. In exploring the situation in Sri Lanka, the process was facilitated by the Key informant interviews conducted with eminent professionals and academic who worked and published on similar areas. Further reviewed works of Louis Wirth (1938) who proposed "urbanism as a way of life" and Henry Lefebvre (1968) who hypothetically suggested the existence of an "urban society" resulted from a complete urbanization.

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The proposed framework is expressed with set of mandates, expressions and subsequently developed attributes to measure the degree of urban influence with reference to three main indications of urbanization or urban way of life which were identified from the literature review. After developing the framework, quantitative approach was used to explore the applicability of the framework at National level using the secondary data sources. In this study, rather than studying people individually, it tries to evaluate the society considering the group of people living in a GND area as the smallest unit.

### 3. Literature review

Hugo, Champion, & Lattes (2001) explained that the measures of urban and rural employed by most of the nations are relatively outdated. Also the criteria which define what urban is varies for different countries based on their physical, demographic, socio-economic, cultural and political conditions, but still many of them are based on similar principles. These criteria also can be referred as the conventional approaches in defining urban.

Few of the basic approaches adopted in defining urban are: Demographic approach which uses population size, Density approach which uses the density of roads, population, houses or households, Economic approach which uses the proportion of non- agricultural occupations, Administrative approach which defines urban areas on the basis of the legal or administrative status, Morphological or the 'brick and mortar approach' based on land use (the extent of the continuous built-up area and the proportion of the 'legal city' covered by the urbanized area) that considers the city as a 'physical entity' and the Functional approach reflects the multi-functional nature of urban settlements and the provision of public and private sector services to residents .

United Nations, Department of Economic & Social Affairs, Population Division (2001) had revealed that predominantly the administrative based qualitative criteria (39% of countries) is used to define urban areas. Size of population based definitions were observed in 20% of the countries, while 10% of the countries use an economic based multiple criteria approach.

Countries use both single and multiple criteria to define urban in their contexts. For an example, India uses a multiple criteria method including demographic, density, economic and administrative approaches. Several limitations are already found in the definitions used. Some are attributed to the underlying principles used while the others are influenced by the methodology adopted.

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Most of the quantitative based definitions on 'urban' are based on statistical numbers such as number of population and population density hence do not comprehensively analyses the complexities within the society that might have strong implications when defining areas as urban or not. In other words it can be questioned whether is it fair to declare areas as urban or not simply looking at the numbers only. Wirth (1938) argued that the degree to which the contemporary world may be said to be "urban" is not fully or accurately measured by the proportion of the total population living in cities as the influences which cities exert upon the social life of the man are greater than the ratio of the urban population would indicate. He also argued that city is not only the dwelling place and workshop of modern man, but it is the initiating and controlling centre of economic, political and cultural life.

Even through the approaches such as economic, morphological and functional approaches attempt to identify urban and rural characteristics by studying the areas going beyond numbers, each approach alone does not adequately capture the characteristics which distinguishes between urban and rural. For example when trying to classify the areas based on the proportions of occupational distribution over agriculture and non-agricultural areas, areas which are predominantly agricultural might carry urban characteristics such as high proportion of built-up areas and upgraded infrastructure facilities due to development schemes introduced by the government (Weeks, 2010).

Almost all these definitions are based on the underlying assumption that two separate entities named urban and rural do exist. It is only then the areas can be classified as urban and rural. But it is questionable whether such types of two separate entities as urban and rural do exist in the present world. Wirth (1938) pointed out that since the city is a product of growth rather than of instantaneous creation, the previously dominant modes of human association always may have the influences upon the present modes of life. Pahl (1966), argued that rural/urban dichotomy needed to be replaced with a rural/urban continuum.

#### **4. Situation review of urban definition in Sri Lanka**

Sri Lanka uses a single criteria method including a pure administrative method. There are three types of local authorities in Sri Lanka naming Municipal Councils (MC), Urban Councils (UC) and Pradeshiya Sabhas (PS). According to the definition, MC and UC areas are considered 'urban' while PS areas are considered rural. Since Sri Lanka's definition of urban is based on a pure administrative approach, the definition of urban has changed over time as the administrative boundaries were altered.

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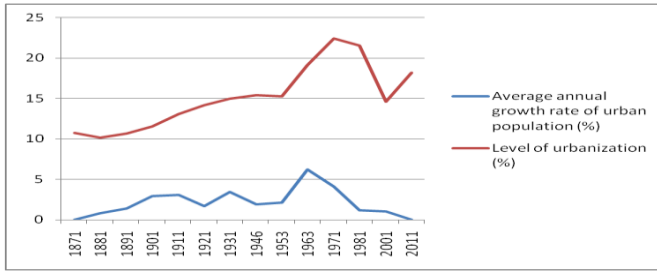


Figure 1, Urban Growth in Sri Lanka, 1871 -2011 (Source: Population Census and Demography Division, Department of Census & Statistics, Sri Lanka, 2012)

When considering the change of level of urbanization over the years, it can be identified that level of urbanization has increased gradually over time from 1871 to 1981 from 10.8% to 21.5%. And the annual growth of urbanization of this period has always been varied in between 0.8% to 3.4% so it indicates a slow growth of urban population over the years. But according to these statistical figures, it can be noted that there is a significant reduction of level of urbanization within the census years of 1981 to 2001 as the values drop from 21.5% to 14.6%. This reduction in level of urbanization is very surprising as there is no way that the urban population to reduce from 3,192,489 to 2,467,171 as there was no such massive out migration or any other cause of reduction of population. The main reason behind this drop of values is the change of policy decision which affected the definition of urban in Sri Lanka. Before 1987, Municipal Councils, Urban Councils and Town Councils areas were defined as Urban but with setting up of Provincial Councils in 1987, these Town Councils were absorbed into Pradeshiya Sabhas which fall into rural sector since then. (Population Census and Demography Division, Department of Census & Statistics, Sri Lanka, 2012) As a result, 89 urban settlements were classified as rural settlements after the 13<sup>th</sup> Amendment to the Constitution in 1987.

Table 1 – A summary of definitions used for Urban in Sri Lanka (1800 to present)

Authority / Person	Time Period	Underlying Principle	Remarks
Government of Sri Lanka (GOSL)	1865 – 1900	Municipal Council (MC) areas & Local Boards (LB) areas were considered as Urban Areas	Characteristics expected in defined areas (water supply & sanitation, Street lighting, market Facilities, efficient Police Service)

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3 Municipalities at that time – Colombo, Galle & Kandy and Local Boards - established for towns larger than ones under Sanitary Boards under the Ordinance No. 13 of 1898 and Sanitary Boards (SB) – established under the Ordinance No. 13 of 1892 for the provision of services of minor towns			
GOSL	1901 - 1920	MC & LB areas as urban	
GOSL	1921 - 1946	35 towns including MC, LB, SB & areas administered by BOI (Board of Improvement) as Urban areas	Areas administered by BOI being defined as urban
'every place which is a Municipality or Local Board, or the seat of a Government Agent, or Assistant Government Agent or of a District Court, or which has been brought under the operation of the special system of deaths registration provided by Sections 31-36 of the Ordinance No. 1 of 1895 was designated as a town.' (Department of Census and Statistics, 1901)			
GOSL	1946	42 towns including MC, UC & LB areas as urban	
Local Government Board (1920) / Urban District Council (1928) /Urban Council (1939) and Town Councils were established in 1946 under the Town Councils Ordinance No. 3 of 1946 to replace Sanitary Boards which were not functioned as urban earlier and under Section 2 of the Town Councils Ordinance No.3 of 1946, 'any area, which by reason of its development or its amenities is urban in character, may by Ministerial order be declared a town'.			
GOSL	1948 – 1981	No change	
At 1963 Census of Population 51 areas administered by TCs were dignified to "urban" status for the first time and number of towns increased from 43 in 1953 to 99 in 1963			
GOSL	After 1980	MC & UC as urban areas	
Town Councils (TC) + Village Councils (VC) = District Development Council (DDC) DDC = Pradeshiya Sabha (1987) under the Pradeshiya Sabha Act No. 15 of 1987 and this caused a decrement in total urban population			
GOSL	At Present	MC & UC areas as urban areas	
Urban population as a percentage in 1971, 1981, 2001 and 2012 is respectively as 18%, 28%, 14.6% and 18.2% which is controversial			

As Uduruwa (2010) highlights, downgraded Town Councils included some of the most dynamic and densely populated suburbs of Colombo such as Maharagama and some fast growing small town in Dry Zone.

Another reason for decreasing trend of level of urbanization is the absence of an island-wide census in 2001. The population census in 2001 enumerated only 18 out of 25 districts due to the war situation in the Northern and Eastern Provinces (Uduruwa, 2010). But the urbanization level reported in 2011

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census which is 18.2% is still less than the urbanization level in 1981 which is 21.5% and that shows the critical problems associated with the definition of urban in Sri Lanka. This suggests that the current definition of urban in Sri Lanka does not capture the urbanization process that the areas defined as rural are currently undergoing.

In summary the overall critiques to the existing definition of urban in Sri Lanka can be identified as; failure to revise boundaries when towns get saturated, not including sociological aspects such as urban way of life in the definition, not capturing the urban/rural interactions and urban influence over the defined rural areas, not considering the physical and social transformations of societies such as development schemes to improve infrastructure facilities, technological advancements, transportation network improvements, change of conventional livelihood and economic activities that may have strong implications on urban status and not taking into account the rapid changes in peoples' life styles that are complex in nature.

### **5. Towards an alternative definition**

Henry Lefebvre (1968) in his book 'Urban Revolution' has argued the need of theorizing 'urban'. In doing so he refers to 'urban' in terms of 'urban society'. As Lefebvre suggests, urbanization is a process that a society undergoes parallel to the historical shift from Agricultural to Industrial and then to an Urban World. He further argued that the society which has been resulted by a complete urbanization process is an 'urban society'. This hypothesis leads to the definition of urban society meaning that it is the society resulting from a complete urbanization. Lefebvre proposes a spatial and temporal hypothetical axis from 0% urbanization to 100% urbanization. In here 0% urbanization refers to the pure nature and the 100% means the completion of the urbanization process. The importance in Lefebvre's hypothesis of complete urbanization is that it brings out the fact that it is the society which is subjected to this process of urbanization. Under this hypothesis, it can be argued that the each society could be positioned at different levels of this urbanization process thus will bear different levels of urbanization characteristics rather than being purely urban or rural.

According to Wirth (1938), urbanization is not just about people being attracted to a place called city and incorporated into its system of life but it refers to cumulative accentuation of the characteristics distinctive of the modes of life recognized as urban which are apparent among people, who have come under the spell of influences of the city. Louis Wirth in his literature 'Urbanism as a way of life', highlights the sociological aspects of 'urban'. He considers three physical characteristics of cities and tries to bring out the sociological

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characteristics hidden behind them, which can be considered as sociological characteristics of urban way of life. The considered three characteristics of city are being relatively large, dense and bearing heterogeneous settlements. Relatively large cities lead to have large numbers of population accounting for individual variability, relative absence of intimate person acquaintanceship and segmentation of human relations which are largely anonymous, superficial and transitory. High density results in social characteristics such as diversification and specialization, coincidence of close physical contact and distant social relations, complex patterns of segregation, predominance of formal social control and accentuated friction. Heterogeneous settlements highlights the breaking down of rigid social structures & produce increased mobility, instability & insecurity, affiliation of the individuals with a variety of intersecting & tangential social groups with a high rate of membership hangover, displaced personal relations, institutions tend to cater mass rather than individual requirement and effective individuals acting through organized groups.

In summary what Wirth tries to explain is that the characteristics of city structure has caused significant urban sociological characteristics such that there is a strong diversification & specialization of people leading into segmentation of societies resulting complex patterns of segregation. Urbanism as a way of life reflects an organization of society in terms of a complex division of labour, high levels of technology, high mobility, interdependence of its members in fulfilling economic functions and impersonality in social relations. Therefore when trying to evaluate the urban status or in other words, the level of urbanization of a particular society, these sociological characteristics resulted from the urban way of life can be incorporated in to the criteria. Way of life can be expressed in terms of Lifestyle, Aspirations and Access to Facilities. (Table 2)

## **5. Results, Discussion & Way Forward**

Since the study is based on a human centred approach, the basic idea was to decide what is urban by looking at the people's way of life. Thus it was necessary to first define the 'urban way of life'. In order to elaborate the 'way of life', three mandates were identified and these are lifestyle, aspirations and level of access to facilities. These different lifestyles, aspirations and levels of access to facilities define people's way of life.

### **4.1. FROM MANDATES TO EXPRESSIONS AND ATTRIBUTES**



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*Table 2 – The explanation of each Mandate*

Mandate	Explanation
Lifestyle	Practices of peoples' day to day life. Through lifestyle the study attempts to map out people's behavior in their regular life. The regular behavior and practices of people's life define their overall way of life. The way people are used to fulfill their needs is very much important in deciding their 'way of life'. Thus in here 'lifestyle' includes the food patterns, clothing patterns, type of shelter and means of communication.
Aspirations	Aspirations is what people dream of doing or in other words their ambitions for future. It is not only lifestyle (What people do in their day to day life) that defines overall 'way of life'. Aspirations (what people really want for their life) also define their way of life. For example if a person currently lives in a village, leading a lifestyle of a village man but he dreams of living a lifestyle of a city dweller, in this situation even though he currently leads more of a rural lifestyle his aspirations are more urban. Aspirations of people are very subjective thus hard to map out for a particular society. But it is important to note that these aspirations are highly influential thus they may be common to a particular society at least to some extent.
Access to facilities	The facilities available in the neighborhood highly influence the people's overall 'way of life'. Due to the lack of common public facilities, people may have to bear a certain way of life which has nothing to do with their personal lifestyles or aspirations. For an example, a person with more of an urban life style and urban aspirations may still could not acquire an 'urban way of life' as the level of facilities he is accessible to do not adequately support an 'urban way of life'. Practically we cannot ignore the fact that level of access to facilities also has an influence in determining one's lifestyle. But at the same time there are instances where lifestyle doesn't depend on level of access to common public facilities as they are highly depending on one's personal choices and capabilities in fulfilling needs.

Expressions of each mandate were identified by employing Maslow's Pyramid of basic human needs. The objective in here was to capture all necessary dimensions of a person's way of life is composed of. Identified expressions are; food consumption patterns, clothing patterns, shelter, means of communication, way of fulfilling water needs, energy consumption, health, waste disposal and education. After identifying the expressions of each mandate, the next stage of the study was to derive attributes under each expression to evaluate the degree of urbanization.

Table 3 –Mandates, Expressions, Sub expressions and Attributes of the Framework

<b>Mandates</b>	<b>Expressions</b>	<b>Sub-expression</b>	<b>Attributes</b>
Lifestyle	Food Consuming Patterns	Types of food	Percentage area coverage of a GND covered under the 8km buffer from selected globally recognized fast food outlets.
		Daily marketing practices	Percentage area coverage of a GND under 3km buffer from selected supermarket chain outlets.
	Clothing Patterns	Types of clothes	Percentage area coverage of a GND under the 15km buffer from selected fashion stores
	Shelter	Type of tenure	Percentage of Rent / Lease household units in a GND
		No. of Storeys	Percentage of household units with two or more stories in a GND
		Type of toilet facility	Percentage of household units having toilets inside the household unit in a GND
		Type of toilet	Percentage of household units having water sealed toilets connected to septic tank or a sewer line in a GND
	Means of communication	Types of communication equipment used	Percentage of houses having Fixed line telephones
			Percentage of houses having Mobile telephones
			Percentage of houses having Desktop Computers
			Percentage of houses having Laptop Computers
		Language Proficiency	Percentage of population with English language proficiency in A GND
		Access to internet	Percentage of population having access to internet at household unit in a GND
	Access to facilities	Water	Drinking Water Source

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Access to facilities	Energy Consumption	Principle type of lighting	Percentage of household units using Electricity from National Grid or Hydro-electricity projects as the principle type of lighting in a GND
		Type of cooking fuel	Percentage of household units using L.P. Gas or Electricity as the main source of cooking fuel in a GND
	Health	Type of service	Percentage of area coverage of a GND under the buffer zone of 25km From selected Private Hospitals
	Solid waste disposal	Solid waste disposal method	Percentage of household units where solid waste being collected by Local Authorities in a GND
Aspirations	Education	Education attainment	Percentage of Population with a degree or above education qualifications in a GND
		Type of school	Percentage of area coverage of a GND under the buffer zone of 10km From selected International Schools

## 4.2. FRAMEWORK TO ASSESS THE INFLUENCE OF URBANIZATION

Lefebvre (1968) highlighted that the urbanization is not a result of capitalism or industrialism but urbanization is the deepest process that the space and society is subjected to from the very beginning, starting with the pure nature. Thus the capitalism, industrialism, globalization and modernization can be considered as the sub processes the space and society could undergo in different time periods of urbanization process. Accordingly each attribute is evaluated and weighted in terms of level of urbanization imprinted in them based on identified three factors, namely: level of globalization & modernization influence, level of dependency in fulfilling a needs and level of technological influence.

4.2.1. *Level of globalization & modernization influence*

Globalization can be understood as one such sub processes that societies is subjected to. The term 'globalization' is widely used to describe a variety of economic, cultural, social and political changes that have shaped the world over the past 50 old years. Hallsal & Cook (2013) argued that the increasing homogenisation of corporate power, sharp increases in wealth and poverty. Yeung (2000) describes Globalization as a multifaceted process of drawing countries, cities and people ever closer together through increasing flows of people, goods, capital, services and ideas. As Manirakiza (2012) explains, the

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real connection between urbanization and globalization is that globalization effects the fate of cities abound by facilitating the rise of mega-cities which are powerful enough to challenge the nation-state and enabling them to become privileged and powerful world economic dynamic leaders.

Modernization on the other hand is also can be viewed as a similar type process that societies undergo with parallel to globalization. Mondal (2015) had listed the loss of group solidarity and community life and traditional large sized joint families on one hand and growing individualism, and smaller sizes of households and development of autonomous personalities in a heterogeneous community on the other, are the commonly observed characteristics of urban as well as modern way of life.

#### 4.2.2. *Level of dependency*

Wirth (1938) pointed out that due to increasing numbers of population and high densities, a large number of people get to interact and live in a limited space thus it leads to the specialization of individuals, particularly in their occupations which sustains based on an enlarged market and which in turn accentuates the division of labour. This character was accentuated with the industrial revolution and has been becoming more and more significant with the complex organizational characteristics built up in production and service sectors. In simple terms, the people in city depend upon greater number of organized groups such as trans-national, global, national and local level organizations operating in production. Deriving from the theories of Darwin, Wirth argues that in human societies, an increase in numbers when area is held constant, it tends to produce differentiation and specialization and as a result, it causes diversification of men and their activities and ultimately increasing the complexity.

#### 4.2.3. *Level of technological influence*

The developments in the fields of science and information technology have made a huge influence in social life in different ways. The most important fact is that these developments in transportation and communication have contributed a lot to enormously expand the urban mode of living beyond the confines of the city itself. (Wirth, 1938) Advancements in communication and transportation technology enable people to share their lives in both urban and rural areas without being confined to one particular end. Thus it has brought enormous changes to the people's way of behavior and can be considered as one dimension in evaluating societies stand in the process of urbanization.

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## 4.3. APPLICATION OF THE PROPOSED FRAMEWORK AT THE NATIONAL SCALE

The above framework was applied to Sri Lanka taking GN Division as the smallest unit of calculation. The data required for each attribute was collected from secondary sources and processed using Arc GIS software to produce maps for separate attribute. The percentage value obtained for GNDs under each attribute was multiplied by the corresponding weight given to the attribute in the evaluation of attributes. Then the values obtained for each attribute were totaled to derive the composite value which represented the level of urbanization of each GND.

*Table 4 – Data Collection Sources*

<b>Data Source</b>	<b>Collected Data</b>
Department of Census & Statistics, Sri Lanka	No. of households of different tenure types
	No. of households of different No. of Storeys
	No. of households of different types of toilet facility
	No. of households of different toilet types
	No. of households with different types of communication equipment (Fixed & Mobile phones, Desktop & Laptop computers)
	No. of population with English language proficiency
	No. of households with access to internet
	No. of households with different drinking water sources
	No. of households of different types of lighting sources
	No. of households using different types of cooking fuel
	No. of households practicing different solid waste disposal methods
Mapped by Author based on locational data available in internet sources	No. of population of different education attainment
	Locations of Super Markets (Cargills, Keells, Arpico & Laugfs)
	Locations of Globally recognized Fast Food Outlets (KFC, McDonalds, Pizza Hut & Dinemore & etc.)
	Locations of Fashion Outlets (Nolimit, Fashion Bug, ODEL, CIB & etc.)
	Locations of Private Hospitals
Survey Department, SL	Locations of International Schools
	MC & UC Boundary Maps ( Urban Areas according to existing definition)

The results of the proposed framework indicated an average of 44% of maximum level of urbanization meaning that Sri Lanka has not yet achieved the complete urbanization with relative to the absolute urbanization assumed in this study based on the selected attributes. When tried to evaluate each GND

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with relation to the maximum of 44%, (By converting the range 0% – 44% into 0% – 100%) it was found that 34% of total population in Sri Lanka lives in areas with urbanization level of more than 50%. This value of 34% is in contrast to the existing urbanization level defined as 18.2%. According to the pattern identified, the highly urbanized areas are significantly agglomerated in Colombo, Kandy, Kurunegala, Anuradhapura and Ratnapura areas and the urbanization trend is that these highly urbanized areas spreading outwards from these main cities. Starting from Colombo, these urbanization effects are spreading towards the country side. A linear pattern expanding from Colombo towards Southern and Central parts and Negombo area can be identified and it can be superimposed with the transportation network in Sri Lanka and identify the linkage between the urbanization pattern and the existence of three main highways connecting Colombo with Kandy, Matara & Chilaw.

It is important to identify that there is a whole new region arising beyond City of Colombo and it is expanding towards Eastern parts of the country. Importantly it is found that, according to this framework, no area can be declared as purely urban or rural.

Even though the results directly indicate the level of urbanization of each area, it actually reflects the urbanization levels of societies living in these areas. Since this framework was developed adopting a human centered approach and by evaluating the people's way of life, even though the final output is a map indicating levels of urbanization of each areas, the core idea is that it reflects the different urbanization levels at which each society is standing at.

#### 4.4. WAY FORWARD

The promising results obtained at the initial stage of the study reveal the possibility of employing the framework at local scale for detailed exploration and verification.

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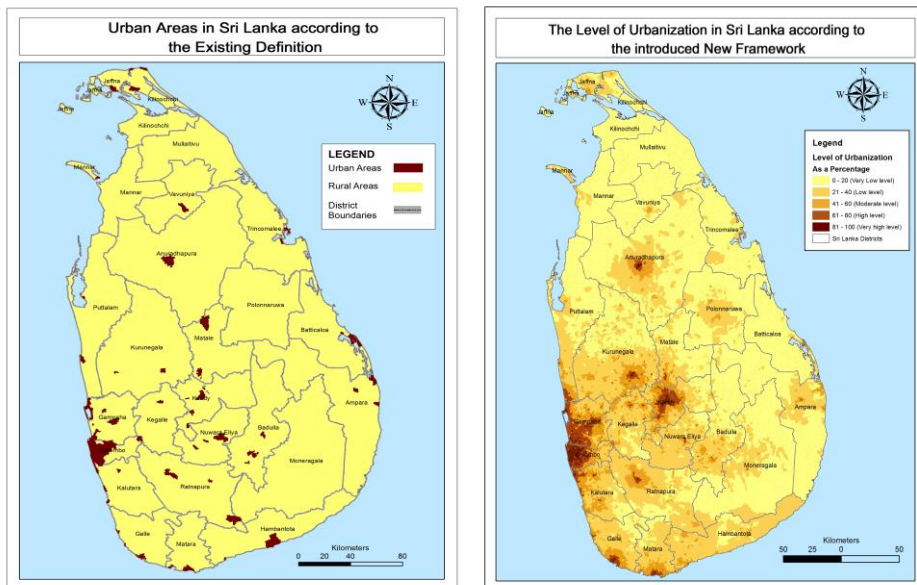


Figure 02, Comparison of urban in Sri Lanka – Existing (left) and proposed

## ACKNOWLEDGEMENT

This study was funded by the Short term Research grant obtained from the Senate Research Council, University of Moratuwa, Sri Lanka.

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