

Residential Segregation in South Asian Cities: An Investigation of Residential Segregation based on Ethnicity of World Heritage City of Kandy, Sri Lanka

RJM Uduporuwa and Lasantha Manawadu

*Senior Lecturer Department of Social Sciences
Sabaragamuwa University, Belihuloya, Sri Lanka
manohariuduporuwa@gmail.com Jeewani@sab.ac.lk
Professor, Department of Geography, University of Colombo, Sri Lanka
lasangeo@gmail.com*

Abstract

Residential segregation of minority groups in cities is undeniable urban reality. Despite a century of research history of urban segregation in a large number of cities, attention drawn to segregation in Asian cities is still insufficient. This article attempts to investigate residential segregation focusing on ethnic landscape of Kandy city with the help of ethnic data in 2012. Duncan and Duncan's (1955) dissimilarity index was applied to measure the segregation of Kandy city and the degree of segregation was determined based on Massey & Denton's (1988) Categorization of dissimilarity index. Thematic maps with the help of GIS 10.2 software were produced to visualize the ethnic landscape and its segregation character of the city.

Findings revealed that the ethnic segregation in Kandy city is significantly dissimilar from the segregation experience in the Western cities. Kandy city is least segregated indicating a more residential mixing of minorities despite it possesses heterogeneity on ethnicity from its inception as Sinhalese kingdom. Segregation index, for all three minority groups in 43 GNDs in the city is below 30 indicating relatively low segregation. However, variations are found in some spatial units. Among the three minority groups Indian Tamils are segregated than Sri Lankan Tamils. Indian Tamils with a nearly moderate segregation index are strong in Poornawatta West which is close proximity to the city center. Muslims are the most segregated minority group in the city and segregation index of them is relatively high along the commercial lines

running across the city. Socio-economic background confirms that Indian Tamils those who are centrally located are the “low income” neighborhood with comparatively worst socio-economic background. In this context, location and growth of low income community in the Kandy city has to be taken in to account by the city planners as one of the issues in the city development.

Key wards- Ethnicity, Residential segregation, Dissimilarity Index, Kandy city, Sri Lanka

1. Introduction

Analysis of social patterns of cities is one of the prime concerns in the study of internal structure of cities. It is one of the many aspects of the urban form and it reflects the social characteristics of urban setting. Basically, the analysis of social patterns of cities is involved with the investigation of its residential distribution pattern which is the result of characteristics of its physical and social design as well as socio-economic and political forces.

The obvious character in relation to the residential function is that the residential sections of a city is divided into several diverse communities termed ‘residential segregation’ or ‘spatial concentration’ creating different ‘residential areas’ in the urban space. Segregation of population groups in cities is not a new phenomenon and various societies have segregated according to a variety of factors for thousands of years. According to Scargill [1] a variety of circumstance influences the residential differentiation of a city. Some of these factors are economic considerations, ethnic composition, religion, race, migration, political and historical events [2], [3] and public policy such as zoning regulations, public housing and housing market.

2. Concept of Residential Segregation and Literature

Residential segregation of cities as an urban problem forms a prominent research issue in a wide range of disciplines, both at a theoretical and at an operational level. In every city there is a certain degree of social segregation between different groups of inhabitants. It can generally be understood as the ‘separation of socio-economic groups’ in urban space. Park [4] in 1926 presents the very first definition of residential segregation. As Park explained, residential segregation is the link that exists between both the social distance and the physical distance. White [5] defines residential segregation as the existing distance amongst those areas inhabited by different social groups. As Massey and Denton [6] defined residential segregation is the degree to which two or more groups live separately from one another, in different part of the urban environment. Jargowsky [7] defined residential segregation as the concentration level of social groups in given areas of the city. According to Sabatini et al. [8] residential segregation is the extent of spatial proximity, or territorial agglomeration, of households belonging to the same social groups, where a social

groups can be understood in terms of race, age, religion or income. As Reardon and O'Sullivan [9] pointed out segregation is extent to which, within a given geographical area (e.g., a city), individuals belonging to different social groups live in neighborhoods characterized by different social compositions.

A large number of studies have been carried out on residential segregation in many cities across the world in past 50 years. Internationally, studies of segregation emerged from the Chicago School in United State. These studies of residential segregation have focused on the effect of the city ecology on the level of residential segregation between groups. The city is viewed as a natural phenomenon rather than an artifact of human creation. Groups residing in the city are sorted into locations according to their socio-economic and demographic backgrounds as well as the urban environment. With this initiation many scholars typically in United State and European countries were interested in studying established patterns and their changes (especially segregation between Black and White) and have produced a bulk literature on this matter. However, Vaughan and Arbaci [10] has pointed out that approaches to understanding urban segregation differ according to geographical contexts and according to different disciplines, which rely on their own concepts, beliefs and research methodologies. European research focuses on social and ethnic differences, Latin American on class differences, Australian on first and second generations of immigrants, whereas research in the United State focuses on racial segregation.

Douglas Massey and Nancy Denton's study of residential segregation in 1988 has gained much attention of researchers. Douglas Massey and Nancy Denton argued that residential segregation is a multidimensional phenomenon based on five dimensions. This idea relies upon the concept that urban socio-spatial structure is inherently multidimensional [11]. The five dimensions they identified are: evenness or unevenness which refers to the unequal distribution of social groups across areal units of an urban area, exposure or isolation which refers to the degree of potential contact between groups within neighborhoods of a city, clustering which is the extent to which areas inhabited by minority members adjoin one another in space, concentration which refers degree to which a group is located near the center of an urban area and centralization which is the relative amount of physical space occupied by a minority group in the urban environment. To verify this conceptualization, Massey and Denton carried out a factor analysis of 20 indices using 1980 census data for U.S and has recommended five indices as most suitable to apply in the segregation studies.

3. Significance of Investigation

Investigation of residential segregation is important since it is one of the important issues in urban planning. It should be taken into account for planning in cities to be successful. Planner's responsibility is to understand any urban constraints, problems, and the relations among communities as well as the impact of urban planning on the community or individuals who are living in planned communities. As Newby [12] explains residential segregation involves a spatial separation of social groups, and spatial separation undoubtedly reduces the interaction among social groups over the

urban space. Concentration of population groups with similar characteristics across any urban area means a less interaction among population groups over space. Furthermore, such a clustered distribution of similar groups might lead some adverse situations such as income inequality, criminality, jobless, low educational attainment within the city. These situations may be extremely problematic because these social groups are not accessible to better facilities, resources, amenities and opportunities which affect social and economic well-being of those population groups. Therefore, understanding of residential differentiation of cities is much important in formulating housing and planning policy.

Urban racial segregation has been a problem to many cities in developed countries. Many researchers have interested on the urban segregation issues since long time ago. To understand and plan a better community, urban planners needs to know how to measure the segregation and interpret the results. It is also no secret to community leaders and planners that the social characteristics and needs of these various communities vary greatly, and that policies and programs need to be designed accordingly. Therefore, systematic investigation of residential distribution of cities will provide a more reliable understanding of their locational patterns and causes associated with them.

4. Measuring Segregation

There are different numerical measures in the economic and sociological literature that have been used to assess the extent of segregation between different groups. Dissimilarity Index is one of popular and the widely used index in measuring dimension of “evenness” in segregation. It is much popular among the researchers since it can be consistently constructed with available census data over long periods of time and can be easily used to compare segregation levels across groups. Conceptually, dissimilarity measures the percentage of a group’s population that would have to change residence for each neighborhood to have the same percentage of that group in the metropolitan area overall. The index ranges from 0.0 (complete integration) to 1.0 (complete segregation). Segregation is smallest when majority and minority populations are evenly distributed. There are different versions of dissimilarly indices which have been employed to measure residential segregation. Williams [13], Duncan and Duncan [14], Cortese et al.[15], Taeuber and Taeuber [16], Winship [17], Falk et al. [18], Massey [19], Kestenbaum [20], Inman and Bradley [21], Massey [22], Morgan and Norbury [23], Sakoda [24], James and Taeuber [25] and White [26] are some such measures used in studies. These measures can be categorized into three major categories: one group measures, two group measures, and multi group measures. Location quotient, Gini index of segregation (G), neighborhood diversity index (NDI) are some of the other widely used indexes for measuring the segregation in urban areas.

This paper investigates the residential segregation in Kandy city, Sri Lanka based on its ethnic landscape. Ethnic composition of a city is one of most influential factors for residential segregation of a city. In all cities there are different ethnic groups belong to distinct socio, economic and cultural settings and they separately

live in the same urban space from the majority group. The ‘China Town’ in Chicago, Black ghettos in the large cities of Midwest and Northeast America, ‘The Little Italy’ of New York, ‘Southampton’ in London, Italian and Jewish ethnic pockets in Toronto are popular examples for this phenomenon and apartheid Blacks and Whites, Algerian ghettos in France or Turkish ghettos in Germany and ghettos in the outskirts of large cities of India are such examples from developing countries. Sri Lanka is a county with diverse ethnic makeup but a few research have been conducted on spatial patterning of residential segregation [27.1], [28]. This paper focuses on degree of residential segregation of minority groups from the total population in the Kandy city.

5. Data and Methodology

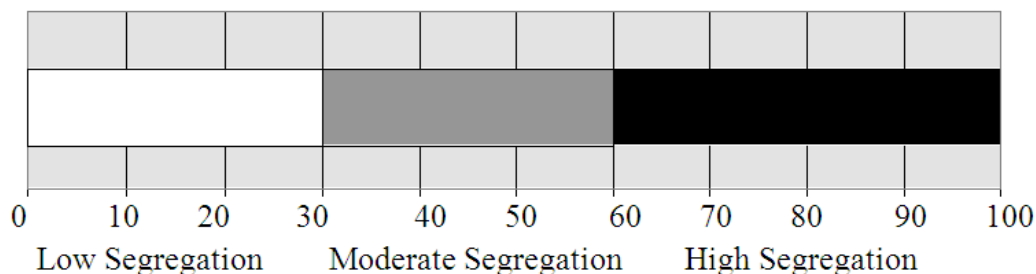
This study depend on ethnic statistics collected from each Grama Niladari Office (43 Grama Niladari Divisions) in 2012. Most authoritative index of dissimilarity or segregation index (when it is applied to certain ethnic group and total population of the city is called segregation index) was computed with the help of Excel software 2007 to measure the degree to which minority groups are spread across the city. The basic formula for the index of segregation is:

$$IS = \{(x_i - t_i) / 2\} / (1 - X/T)$$

- x_i = Percentage of total population of group X in spatial unit i
- X = Total population of group X in the city
- t_i = Percentage of total population in spatial unit i
- T = Total population in the city

The degree of segregation of minority groups from the total population was determined based on Massey & Denton's Categorization of the Index of Dissimilarity and it is as follows.

Segregation sensitivity: Massey & Denton's Categorization of Dissimilarity Index



Thematic maps with the help of GIS 10.2 soft were produced to visualize the spatial pattern of residential distribution and based on ethnicity.

6. Ethnic Concentration and Composition in the Kandy City

In Sri Lanka, there is a mixture of ethnic groups. Although, census in 1911 identified 78 ethnic groups, presently Sinhalese, Tamils: Sri Lankan and Indian Tamils, Muslims, Burghers, Malays are the ethnic groups living in Sri Lanka. Sinhalese are the largest ethnic group in the country, officially comprising 75 percent of the population [29]. The Tamil speakers in Sri Lanka are divided into two groups that have quite different origins and relationships to the country. The Sri Lankan Tamils trace their immigration to the distant past and are effectively a native minority. In 2011 they numbered 11 percent of the population. The Indian Tamils are either immigrants or the descendants of immigrants who came under British sponsorship to Sri Lanka to work in plantations in the central highlands comprises 4 percent (2011) of the total population. Muslims, who make up approximately 9 percent of the population, practice the religion of Islam. They are of Arabic origin and came to Sri Lanka as traders. Others comprises 1 percent of the total population are Burghers, Malays and other foreigners.

Kandy city functions as the second largest city in Sri Lanka outside the Colombo Metropolitan area and the most important city in the Central hill county Sri Lanka. It is great national important since it is being the major cultural, commercial, administrative and transport center of the hill country during the last 600 years history since its established as the capital of the Kandyan Kingdom in the 15th Century. Due to its historic value which was shaped by different ruling periods of local and colonial this has been inscribed as a World heritage city by UNESCO in 1986. The most significant cultural character of the Kandy city is the location of the Sacred Tooth Relic Temple along with its surrounding which is recognized as a monument of World Heritage. From 1594 Kandy was invaded by Portuguese (1594) Dutch (1802) and British (1815) and affected by their socio-economic and cultural setting.

Early Sinhalese kingdom of Kandy was highly stratified based on ethnic or class (occupation) from its inception in 1592 and ethnic and class-oriented segregation therefore, was obvious character. Ethnic and class based segregation were based on the type of service performed for the King. The Sinhalese who originally settled in Kandy city when early kingdoms which were dominant in the north central area moved to the western lowlands and surrounding areas of the Kandyan kingdom [27.2]. In the city isolated residential clusters and sharp segregation according to the rank of the service were dominant in the central area of the city. Monarchs occupied in large spacious houses called “Walawwa” and they lived in the areas closed to the palace which was the symbol of power and safety [30]. Some of these Walawwas during the British era were converted into the administrative buildings. The aristocratic (high class residential areas) lived in separate streets and others lived in another separate streets allocated for them. In addition, there were several ethnic groups in the kingdom who settled in the different parts of the city.

Existence of Sri Lankan Tamil population in the city as a result of marriages of four Sinhalese kings who have had Tamil origin with princess in India. Relatives of princess who arrived to Kandy settled down in some streets and engaged in the trade and commercial activities. Muslims and Chetties also have arrived in small number for the purpose of trade and commerce and lived separate streets. Malays who served

in the British army settled in the city corners in the later part of the 19th century. Arrival of the Indian Tamils from India into the city was with the British sponsorship for the plantation sector in the country. All these ethnic groups have increased in number with the development of the city in the different ruling period of kings, Europeans and the local administration after the independence.

Figure 01 shows the trend of ethnic composition in the city of Kandy from 1881 to 2012. One of the noticeable characters in terms of change of ethnic situation in the city is that an increasing trend in Sinhalese community from the 1881 to 2012. Sinhalese as the majority has increased by 33 percent during the last 131 years and presently it is 71 percent which is almost equal to the countries composition of 75 percent. In case of trend in minority groups, there is a decreasing trend except Muslims which have undergone a slight increase. Declining trend of other ethnic groups such as Indian Tamils, Malays, Burghers, and Europeans occurred in the country also visible in the Kandy city. According to the figures in 2012 the city comprises 71 percent of Sinhalese, 8 percent of Ceylon Tamils 3 percent of Indian Tamils, 12 percent of movers, 0.97 percent of Malays 0.52 percent of Burgers and 0.43 percent of others.

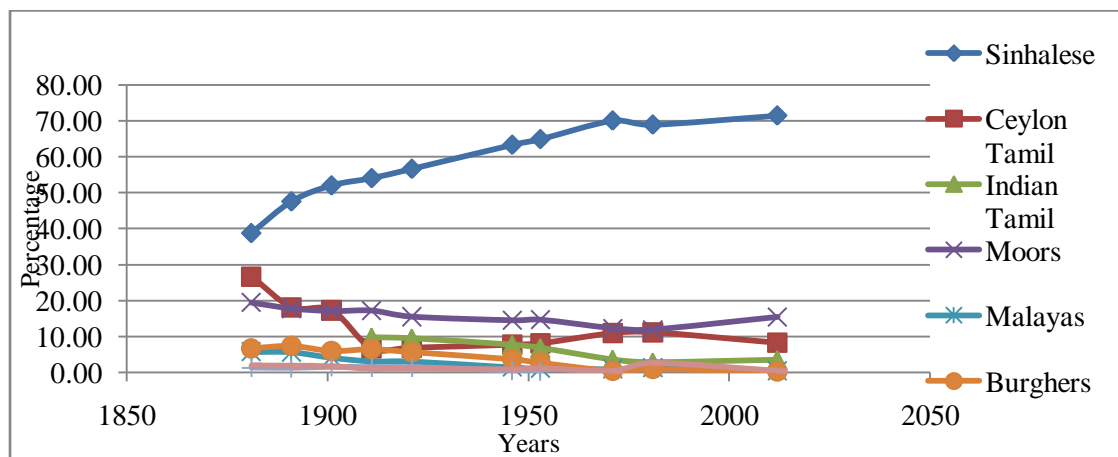


Figure 01: Ethnic Composition in the Kandy City from 1881 to 2012

7. Distribution Pattern of Ethnic Groups in the City

Figure 02 with the proportion (percentage) of each ethnic group in Grama Niladari Divisions gives a depiction about the relative concentration of each ethnic group in spatial units (GNDs) in the city. The observable distinct pattern regarding spatial distribution of ethnic groups in the city is that the majority of Sinhalese are concentrated at the periphery while minority groups are intense at the city core, its proximity areas and along the main road running through the city center. Sinhalese as the majority group reside in all Grama Niladari Divisions from 20 percent to 97 percent. It is obvious that there are 18 Grama Niladari Divisions which are nearly half of total consists more than 80 percent proportion of Sinhalese and they are located at the Eastern and Western edges of the city. Sinhalese are least in the city center, its

proximity and along the major roads running through the city where the minority groups are strong. The least percentage is found to be in the Poornawatta-West GND where the Indian Tamil population is the highest. Sri Lankan Tamils who are native Tamils in the city today accounts for 8 percent of the total population spread out in each Grama Niladari Division. Proportion of Sri Lankan Tamils in most of the Grama Niladari Divisions is small while very few of them situated close to city center and along the major road contain considerable amount (19 percent to 32percent). Indian Tamils who arrives as the labours in the plantation sector in the up country area has a distinct distributional pattern in the city. Indian Tamil is relatively a very small percentage (3.4 percent) of the total population in the city is gathered city center areas. The highest proportion which is 54 percent of Indian Tamils is found in Poornawatta-West Grama Niladari Division where the other ethnic groups are less than 25 percent and very close to the city center. In addition, Watapuluwa-South and Mahaiyawa Grama Niladari Divisions closed to the city center consist considerably high proportion if Indian Tamils of 17 and 18 percent respectively. Muslims whose' s proportion is 12 percent of the city total are expansive in the city but a large amount is residing in the city center, along the main roads running through the city center and northern part of the city where commercial functions have been strongly developed. Burgers and Malays according to their proportion are not much significant.

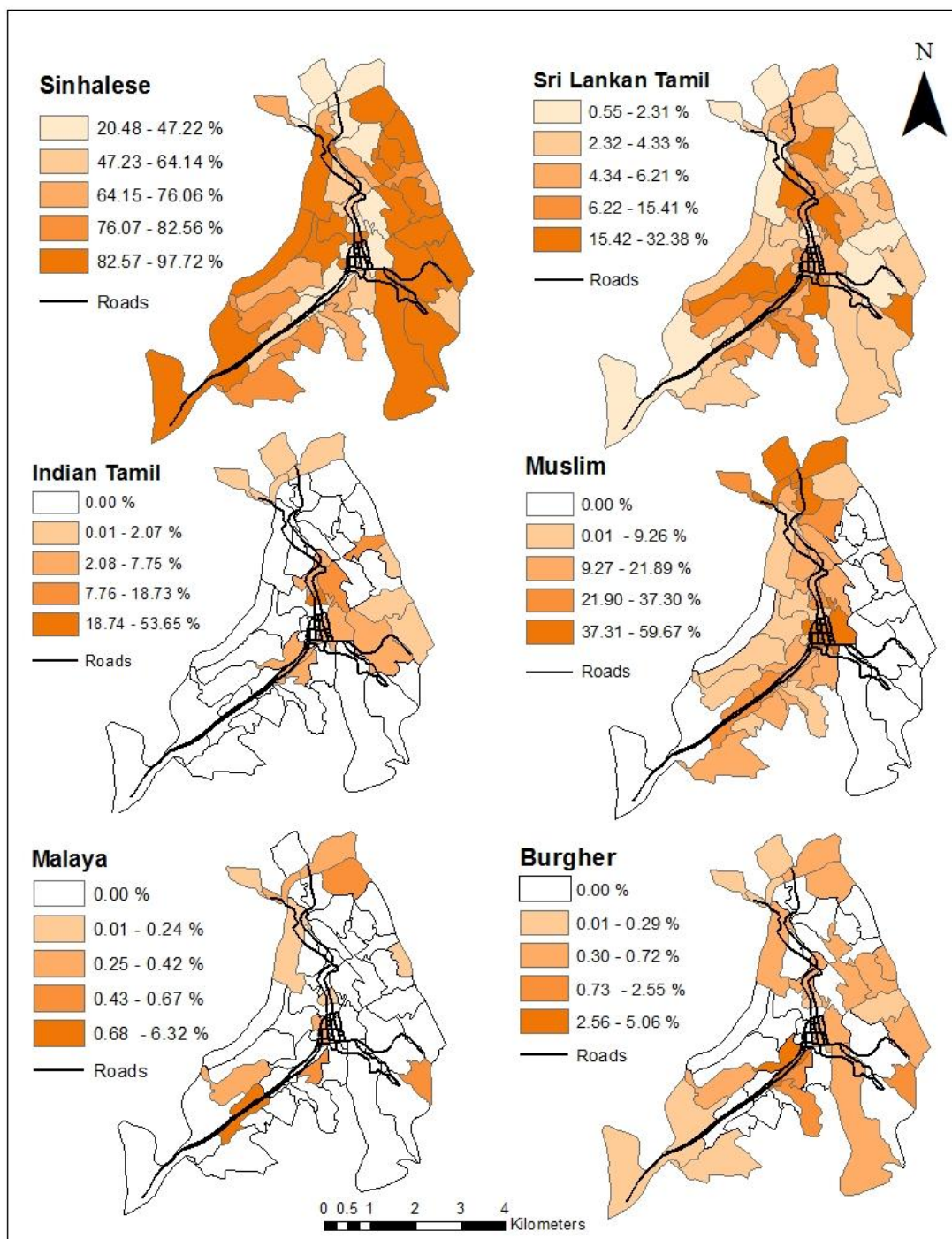


Figure 02: Spatial Distribution of Ethnic Groups in Kandy City-2012

See Appendix 01 for names of Grama Niladari Divisions of Kandy City

8. Results and Discussion

8.1. Depicting Pattern of Ethnic Segregation in the City

Results of application of segregation index introduced by Duncan and Duncan (1955) to measure overall degree to which ethnic groups live separately from one another in Kandy city are displayed in the Table 01, Table 02, Table 03 and Figure 03. As Tables reveal values of segregation index calculated for three minority groups in each Grama Niladari Divisions in the city are mostly below 30 indicating relatively low segregation in most Grama Niladari Divisions and moderate in a few of them according to Massey & Denton's Categorization of sensitivity of segregation index. Conceptually dimension of evenness is maximized and segregation minimized when all units have the same relative number of minority and majority members in the city as a whole and conversely evenness is minimized and segregation maximized when no minority and majority members share areas of residence. Accordingly, in overall sense, Kandy city has a more mixed residential pattern rather than a segregated residential pattern.

However, the overall picture is residentially mixed considerable variations exist in some spatial units when turning to the minority group wise segregation index in each Grama Niladari Divisions. As values indicate Muslims and Indian Tamils are segregated than Sri Lankan Tamils. Sri Lankan Tamils who are descendants from early Sinhalese kingdom of Kandy are present in every Grama Niladari Division and a higher proportion is found in Grama Niladari Divisions closed to the city center (Figure 03). According to the secondary sources Tamils who arrived as relatives of princess and trades from India lived in the separate streets in the historic city core of the city and this pattern has not changed even today. Their Segregation is insignificant (below 11.40 percent) in most Grama Niladari Divisions while it is fairly significant (11.40 -16 percent) only for several Grama Niladari Divisions closed to city center where its proportion is relatively high (Figure 02).

Indian Tamils whose proportion is 3 percent in the city are segregated than Sri Lankan Tamils. Existence of the Indian Tamils in the city is after 1900 (Figure 01) first as plantation works and servants of British officials generally possess a low living standard. With the collapse of the plantation sector in the hill country they have gathered in some large cities in the country and serve as workers and labours in many sectors in cities. As shown in the figure 02 Indian Tamils are not present in every Grama Niladari Division but in a few Grama Niladari Divisions with varying degree. They are strong in Grama Niladari Divisions located in the city center and around it. Therefore, segregation index is not sensitive in most of Grama Niladari Divisions where Indian Tamils are absent and small in size. The observable distinctive character of location of Indian Tamils in the city is that they are much stronger in only one Grama Niladari Division which is Poornawatta-West located one and half km distance. The highest proportion which is over half of its total population as well as the highest value of segregation index which is 25 percent (Table 02 and figure 03) are found in Poornawatta-West Grama Niladari Division. Accordingly, segregation index in Poornawatta Grama Niladari Division is seen to be nearly moderate. In addition, Indian Tamils are segregated in Mahaiyawa and Watapuluwa-South Grama Niladari Divisions but small in number.

Table 01: Sri Lankan Tamil Segregated Areas in Kandy City-2012

GND Code	GND Name	Percentage	Segregation Sensitivity	Status (According to Massey & Denton's Categorization)
265	Suduhumpala East	23.30	11.40	Low
234	Aniwatta East	23.31	11.86	Low
255	Katukale	24.59	12.42	Low
264	Bogambara	26.19	13.62	Low
237	Mapanawatura	24.42	11.48	Low
257	Mahaiyawa	22.87	11.08	Low
252	Ampitiya North	32.38	16.63	Low
Segregation index for all other Grama Niladari Divisions is below 11.40 percent				

Table 02: Segregation Sensitivity for Indian Tamil Population in Kandy City-2012

GND Code	GND Name	Percentage	Segregation Sensitivity	Status (According to Massey & Denton's Categorization)
240	Poornawatta West	53.66	25.89	Nearly moderate
239	Mahaiyawa	18.74	8.38	Low
230	Watapuluwa South	17.94	8.55	Low
Segregation index for all other Grama Niladari Divisions is below 8.38.40 percent				

Muslims whose proportion is 12 percent in the city are the most segregated minority group in the city. Concentration of Muslims as traders in early Sinhalese kingdom has a long history. In early kingdom Muslims similar to the Tamils too lived in city center for the commercial function of the city dwellers and have expanded thought the city today (Figure 02). Therefore, segregation index is sensitive in all Grama Niladari Divisions at varying amount. Segregation index in nearly half of Grama Niladari Divisions located in the periphery of the city is below 10 percent and is an indication of least segregation of Muslims in those areas while the other half of Grama Niladari Divisions located in the city center, along the road line and the northern part indicating moderate segregation. Senkadagala, Siyambalagasthanna, Galawatta located at the periphery have highest values and other Grama Niladari Divisions located city center and along the commercial line (main road) vary from 10.16 to 31.78 percent. Therefore, segregation of Muslims is relatively high along the commercial areas running from Peradeniya to Katugastota rather than its periphery.

Table 03: Segregation Sensitivity for Muslims in Kandy City-2012

GND Core	GND Name	Percentage	Segregation sensitivity (%)	Status(According to Massey & Denton's Categorization)
224	Aruppola-East	18.09	10.65	Low
226	Siyambalagasthanna	53.95	31.78	Moderate
260	Welata	25.20	14.83	Low
255	Katukale	17.26	10.16	Low
258	Ihala Katukele	46.44	27.35	Nearly moderate
240	Poornawatta-West	24.63	14.49	low
241	Poornawatta-East	21.89	12.89	Low
237	Mapanawatura	17.52	10.31	Low
250	Pitakandagama	19.92	11.74	Low
225	Tittawala	32.30	19.01	Low
239	Mahaiyawa	17.44	10.26	Low
257	Mahanuwara	40.67	23.95	Low
415	Yatiwawala	26.36	15.52	Low
607	Galawaththa	51.53	30.35	Moderate
251	Senkadagala	59.67	35.15	Moderate
608	Nawayalathanna	47.84	28.18	Nearly moderate
256	Katukele-West	37.30	21.97	Low
Segregation index for all other Grama Niladari Divisions is below 10.16 percent				

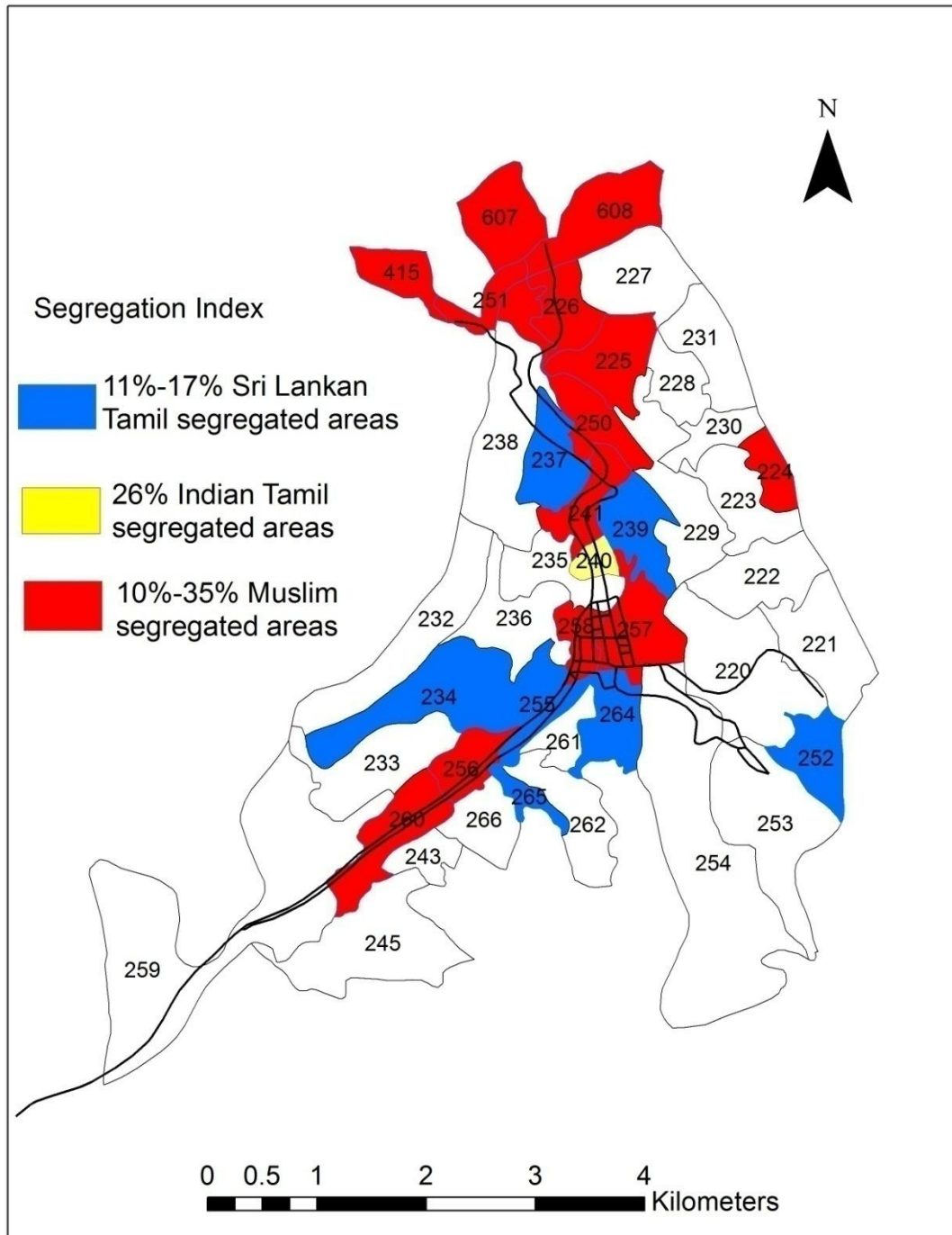


Figure 03: Spatial Segregation of Minority Groups in Kandy City

See Appendix 01 for names of Grama Niladari Divisions of Kandy City

8.2. Factors of Residential Segregation in the Kandy City

Similar to most of the cities in the world, Kandy city also is heterogeneous in terms of socio-economic settings of its inhabitants. Societal heterogeneity mostly makes its different inhabitants to choose different residential locations suited to them and finally inhabitants who are homogeneous in socially and economically get together and dominate in some areas in the city creating residential differentiations. Most of Western cities are found to be extremely segregated on different contributing factors.

In case of Kandy, the city has a more mixed residential pattern though the city possesses heterogeneous nature on ethnicity from its inception as Sinhalese kingdom. However, in terms of “segregated areas” where segregation index is relatively high, investigation of Socio-economic background of segregated minority groups and physical qualities of areas where they are strong answer the question “why segregation”.

Indian Tamils who are strong in Poornawatt-West is found to be as the “low income group” in the city. Figure 04 and 05 demonstrate the educational background and occupational categories in Poornawatta-West. 60 percent of inhabitants have attended up to grade 8 only. 44 percent and 31 percent of them are engaged in elementary jobs (as labours) and serve as workers in the manufacturing sector. In the view of physical quality, it is located one and half distance away from the city core and the smallest spatial unit in the city among 43 Grama Niladari Divisions. It is located at a concededly higher ground with less accessibility and the most densely populated Grama Niladari Division in the city. As empirically proved by studies poors always tend to concentrate in adjacent areas or city center so as to minimize their commuting cost.

Muslims are found as the most segregated community of three groups since their segregation index is relative a great. The main reason for Muslims to concentrate in the areas where commercial function have developed is not much related with the socio-economic background but to their preference to engage in the trade and commercial activities in the city. According to the occupational structure of moderately segregated areas of Muslims (Figure 06) they can be regarded as middle class people. Muslim segregation is more noticeable along the commercial strip, city center and northern edge of the city. The highest segregation of Muslims is in the Northern edged of the city where there is a new trend of developing commercial activates today. Therefore, unevenness of the distribution pattern of the Muslims is relatively higher than the Sri Lankan and Indian Tamils.

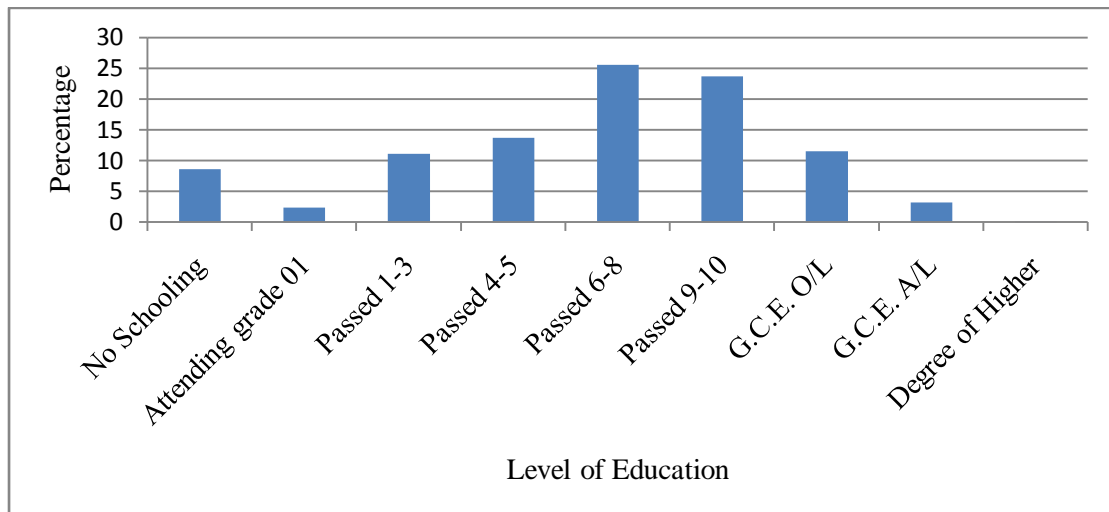


Figure 04: Educational Performance of Poornawatta-West Grama Niladari Division in Kandy City-2001

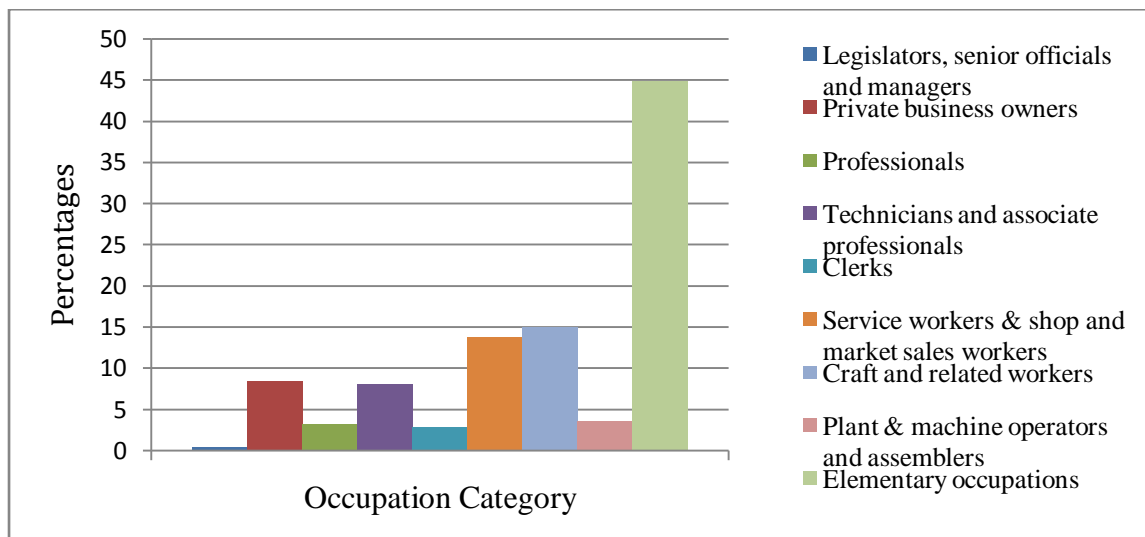


Figure 05: Occupational Status in Poornawatta-West Grama Niladari Division in Kandy City-2001

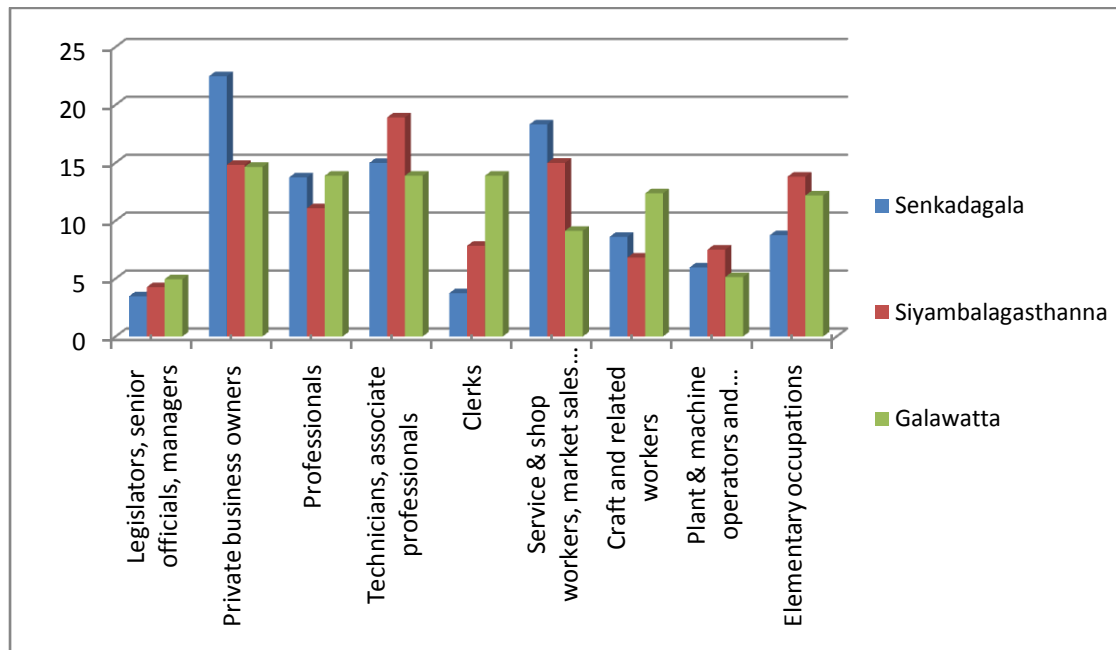


Figure 06: Occupational Structure in Muslim Segregated Areas in Kandy City-2001

9. Conclusion

Existence of segregation in cities is a common factor. Its existence is due to the different socio-economic settings of its inhabitants. Ethnicity is one of strong factors of such a situation and increasingly used as a factor to identify the social groups in cities.

The segregation index introduced by Duncan and Duncan widely applied for Western cities is a good measurement to investigate the degree of spatial spread of minority groups from the other living in an urban area. From recent past this is increasingly being used for the cities in developing countries also to identify the segregation different ethnic minorities and its application has successfully captured the prevailing location patterns of social groups. Straightforwardness, compatibility with census data and easy calculation make its wide application. Identification of residential patterns of Kandy city also based on the segregation index and field verifications confirmed that the index has captured the real picture of residential distribution of three minority groups in the Kandy city.

Segregation index shows that not like the western cities, though some variations exist Kandy city is least segregated indicating a more mixed residential pattern. In the overall sense, its sensitivity for all three groups is below 30 which generally interpreted as equal distribution or mix up of three groups across the city.

Variations exist in segregation index among three groups suggest that the Sri Lankan Tamils are the least segregated group and Muslims are the highest segregated group. All areas with relatively higher segregation index are found at the city center,

its close proximity and along the commercial spine which have emerged along the main road running across the city. As recorded in the historical documents all ethnic groups in the early Sinhalese kingdom lived at the city core. Even today, this remains unchanged for minorities except the Sinhalese who have gradually shifted to the periphery with its rapid increase during the last periods.

Relative segregation of low income dwellers from the main structure of the city life on the basis of ethnic, race, caste, religion, and language in large cities in South Asian countries even in the Colombo city is found to be a common factor in the Kandy city too. Indian Tamils whose presence after the British occupation in the city found to be as low income dwellers with comparatively worst socio-economic background have concentrated nearly moderate level in Proonawatta West Grama Niladari Division which is one and half Km distance to the city center. As revealed by a large number of studies, in general, they create many critical issues in the field of social, economic, demographic, and environment in the urban environment. In this sense, one of the most vital issues to be addressed by urban planners and the policy makers in urban development in the city is the location of low income group in the closest areas to the city center. Although the degree of segregation of low income group in the city is not yet a critical issue it will become a challenge in the city development with their natural increase in the future. Therefore, realization of this aspect of growing cities is important in their sustainable urban development.

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Appendix -01:Grama Niladari Divisions of Kandy City-2012

GND Code	GND Name	GND Code	GND Name
224	Aruppala-East	250	Pitakandagama
259	Getambe	231	Mahaweli Uyana
226	Siyambalagasthanna	228	Watapuluwa
227	Mavilmada	225	Tittawela
245	Bowala	230	Watapuluwa-South
243	Mulgampala	223	Aruppala-West
266	Suduhumpala-West	239	Mahaiyawa
260	Welata	257	Mahanuwara
265	Suduhumpala-East	222	Lewella
234	Aniwatta-East	221	Thalwatta
233	Aniwatta-West	220	Boowelikada
262	Nagasthenna	253	Ampitiya-South
261	Deiyannewela	229	Watapuluwa-West
255	Katukele	252	Ampitiya-North
236	Bahirawa Kanda	254	Malwatta
232	Nuwara Dodamwala	415	Yatiwawala
264	Bogambara	607	Galawaththa
258	Ihala Katukele	251	Senkadagala
235	Asgiriya	608	Nawayalathanna
240	Poornawatta-West	256	Katukele-West
241	Poornawatta-East		
237	Mapanawathura		
238	Wattaramthanna		

