

# Building Densification as a Strategy for Urban Spatial Sustainability Analysis of Inner City Neighbourhoods of Dar Es Salaam, Tanzania

John Lupala<sup>1</sup>, Sajjad Ali Bhayo<sup>2</sup> and Sajjad Ali Bhayo<sup>3</sup>

<sup>1</sup> Ardhi University

*Received: 10 December 2013 Accepted: 3 January 2014 Published: 15 January 2014*

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## Abstract

Building densification in developing countries is shaping the spatial patterns of the inner city neighbourhoods. The densification processes are fuelled by higher land values and real estate market dynamics. Due to increased land values, new building forms, uses and density are emerging. Although densification is considered as a strategy to achieving compact development and city spatial sustainability, the unguided nature of building redevelopment is increasingly posing threats in terms of diminishing spatial and liveability qualities in these neighbourhoods. This paper examines the building densification processes in two neighbourhoods of Dar es Salaam City and the resulting effects in terms of plot coverage, floor area ratio and overall spatial patterns are explored. Observations, measurements, transect walks, interview with officials and map analysis were the key methods employed in gathering data. Results indicate that in one of the neighbourhoods, building redevelopment was taking place without a proper redevelopment plan to guide the process. In both cases, several buildings were noted to have higher plot coverage and floor area ratio above the recommended guidelines. This was compounded by the weak development control mechanism culminating into poor spatial and liveability qualities. There is therefore a need for preparing plans that will guide the redevelopment processes, instituting effective development control measures and revisiting the possibility of combining plots to facilitate flexibility in design and move towards urban spatial sustainability.

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*Index terms*— building densification, plot coverage, floor area ratio, spatial quality, sustainability and dar es salaam.

## 1 I. Introduction

lthough urban sprawl is a characteristic feature in most cities of the developing world, the pressure for increased building density towards compact city development is increasingly becoming imminent. It is common in these countries that the rapid city spatial expansion goes hand in hand with transformation of old low rise residential with high rise residential cum commercial neighbourhoods. Worldwide, densification has been recognized as one of the tools for achieving compact city forms and sustainable urban development. Densification that culminates into compact cities has the advantages of reducing vehicle movement, environmental pollution and energy consumption. Densification creates good premises for provision of public transport, effective usability of infrastructure, open space, public realm and business opportunities (Paez, 2012;Cereda, 2009). Paez (2012) further argues that compact nodes are helpful in controlling unplanned urban spatial growth in the cities. High-density areas promote walkability, discourage vehicular movement and also prevent urban sprawl (Long, McGrath

41 and Kolder;2011). In addition, urban densification promotes social interaction, social inclusions and cultural  
42 enrichment in the cities (Bahadure and Kotharkar, 2012). It sounds that all basic facilities such as schools,  
43 shopping, parks and playgrounds can be effectively allocated at walking distance. Therefore, people can get  
44 equal benefits from these facilities if optimal densities are achieved (ibid.). Aggregated together, these qualities  
45 culminate into liveable cities and sustainable urban development.

46 Literature indicate that the most compact and vibrant European city is Barcelona, which has an average density  
47 of 400 dwellings per hectare (The Urban Task Force, 1999; Lupala and Namangaya, 2010). Although increase  
48 in density is consistent with the idea of sustainable neighbourhoods, higher densities also carry the connotations  
49 of urban cramming (ibid.). From economic perspective, literature further indicate that land economy gains are  
50 being achieved from increasing densities from 20 to 25 dwellings per hectare to 35 to 40 dwellings per hectare  
51 ??Barton in Breheny, 1992). Despite the fact that land use gains diminish above these levels, research confirms  
52 that higher densities allow greater number of public amenities and transport facilities to be provided (ibid.).  
53 As density levels increase to 40 to 60 dwellings per hectare, the land take diminishes rapidly. More people are  
54 close enough to communal facilities to walk, and efficient bus service can be made viable. Increased densities  
55 contribute to energy efficiency. If increased densities contribute to these urban qualities, it can therefore be  
56 argued that building densification can The approach towards urban densification may include increase in Floor  
57 Area Ratio (FAR) and Land Coverage (LC). It implies that appropriate use of FAR by increasing more floors  
58 in building increases more space to accommodate more functions in one building. City spatial sustainability has  
59 been viewed as a useful economic approach because it can attract more capital investment and job opportunities  
60 in compactly built cities (Bhayo, 2014). To be able to analyse city spatial sustainability, land coverage (depicting  
61 the horizontal expansion of built environment) and Floor Area Ratio (how vertical development building are)  
62 becomes instrumental variables.

## 63 2 II. Density as a Concept

64 Density as a concept has been in academic currency for many years. Several authors have discussed density from  
65 varying perspectives. There has not been a consensus on the actual definition of density apparently because of  
66 the varying contexts, perceptions and values attached to this concept. It is from these variations that many  
67 authors have shied away from definitively arguing for what is high or low density. However, a number of authors  
68 have attempted to define density from physical, social, temporal and perceptual perspectives. Physical density is  
69 largely manifest in form of floor area ratio and land coverage and building heights (James, 1967;Rapoport, 1975,  
70 Correa, 1985; ??ewman and Kenworthy, 1989;Barton, 1992;Breheny, 1992;Jelinek, 1992;Alexander, 1993;Acioly  
71 and Davidson;1996; ??åberg, 1996 and ??renas-Gomez, 2002). Physical density (sometimes referred to as  
72 objective density) has been examined as land use ratios (Lupala, 2002). In housing and urban design, density has  
73 been measured in terms of floor area ratios, plot coverage and dwelling units per specified area (Alexander, 1993;  
74 ??åberg, 1996). While Floor Area Ratio (FAR) is a unit of density referring to the floor space in relation to plot  
75 or land area, plot coverage refers to the proportion of built up areas to that of plot area expressed in percentage.  
76 Floor Area Ratio largely expresses the verticality of buildings while coverage expresses the horizontal coverage  
77 of built spaces. In common practice, density has often been referred to as a degree or intensity of development  
78 or of occupancy. The social cultural perspective of density focuses on such variable as levels of social interaction  
79 and feeling of control (Rapoport, 1975). Density can also be viewed from temporal aspects such as fast tempos  
80 and rhythms of activities and associational or symbolic relating to the presence or absence of, tall buildings  
81 or apartment buildings, absence of private gardens (ibid.). In this paper, emphasis is being put on physical  
82 density because it is more practical to objectively operationalize its variables. Some of the key questions that  
83 are worth examining are; what are prevailing plot coverage and floor area ratios in densifying neighbourhoods of  
84 Dar es Salaam? Is the type of densification notable contributing towards spatial sustainability of the city? What  
85 challenges and opportunities are being posed by the on-going densification processes?

## 86 3 III. Spatial Growth Trends in Dar Es Salaam City

87 Dar es Salaam city has a jurisdictional area of 147,557 hectares and its built up area is estimated to be 115,372  
88 hectares. The built up area is equivalent to 71 percent of the jurisdictional area (TACINE, 2013). By 1892,  
89 the spatial extent of Dar es Salaam was limited to only 2 kilometre radius from the city centre. This coverage  
90 increased to 6 kilometres in 1963, 17 kilometres in 2002 and 30 Kilometres in 2012 (Bhayo, 2014). The four  
91 major arterial roads radiating from the centre are the key features structuring the spatial pattern of Dar es  
92 Salaam city. The city has grown up to 30 kilometres northwards along Bagamoyo Road, 28 kilometres westwards  
93 along Morogoro Road, some 32 kilometres southward westwards and south eastwards along Pugu and Somanga  
94 Roads (Figure ??). This has resulted into a finger-like city spatial structure and corridor development along  
95 these major roads. Density along these corridors is relatively high decreasing as one move away from the major  
96 roads. The fact that almost all employment is located at the city centre where major roads converge or radiate,  
97 the horizontal growth and mono-centric city spatial structure have resulted into severe traffic jams during peak  
98 hours and delays from home to work places. This pattern of growth has culminated into a number of issues  
99 that undermine city sustainability. For example, the increase in the number of vehicles has compounded traffic  
100 congestion problems in the city. The situation is made worse by the increase of motorcycles and tricycles in Dar

es Salaam using the same city roads (Kiunsi, 2013) centre. This figure increased to 11 kilometres from the city centre (outer radius) in the year 2012 (Figure ??). The reason for increased distance with compactness is due to the increase in land coverage especially in the outer radius where many of the vacant plots have been developed (be it low rise or high-rise buildings). In the inner city neighbourhoods, Floor Area Ratio (FAR) is increasing by transforming the old low-rise buildings into high-rise. Detailed results from gradient analysis indicate that land coverage was 45 per cent at 5 kilometre radius in the year 2002. This gradient increased up to 57 per cent within the same distance in 2012. Land coverage was 24, 5, 2, 1, 0.6, 0.4, 0.17 per cent at 10, 15, 20, 25, 30, 35 and 40 km radius respectively, which has reached up 80 to 39, 22, 13, 7, 4, 2, 0.4 per cent, with the same distance intervals in 2012. Therefore, land coverage has significantly increased between 2002 and 2012. In other words it can be argued that although density gradient decreases as one move far away from the city centre, with increase in time, inner city neighbourhoods consolidate in terms of land coverage and floor area ratios registering higher percentage in density gradients. The thrust of this paper was to examine densification processes as a strategy towards compact city development and sustainability. Two neighbourhoods of Kariakoo and Sinza in Dar es Salaam City were selected for data collection and analysis. While Kariakoo has densified to 'saturation stage', similar trends are emerging from Sinza. In these two neighbourhoods, buildings were, and are being transformed in terms of form and uses from residential to commercial, office and other functions. While Kariakoo was part of the Central Business District as recommended by the 1979 Master Plan of Dar es Salaam, Sinza was planned as a "sites and services area" implemented under the World Bank programmes of the 1970s. Therefore dynamics in Kariakoo are more apparent than those in Sinza because of its prime location and relatively higher land values.

In capturing data from the two sites, transect walks, measurement of buildings and observations methods were used. Observation was facilitated by taking photographs and sketching. Observation and measurements were used to capture height and spatial coverage of buildings. These methods helped to capture data on size, spatial form (coverage) and Floor Area Ratios (FARs). Literature review and interviews with officials of Kinondoni Municipality especially on current guidelines used to determine use, height of buildings and plot coverage complemented field studies in the two neighbourhoods. Maps for analyzing jaggedness of Dar es Salaam were obtained ACC-Dar Project (2014). Three blocks were selected from each neighbourhood (Kariakoo and Sinza) for detailed data collection and analysis as shown in Figure 3. 4). Additional guidelines included plot coverage and maximum Floor Area Ratio. While the recommended minimum plot coverage was 30 percent, the maximum coverage was set at 70 percent (Table 1). In terms of building height the recommended minimum was one to two (1-2) and eight to ten (8-10) storeys as the maximum.

Volume XIV Issue VIII Version I Source: Kariakoo Area Redevelopment Scheme (URT, 2002)

It is important to note that despite the existence of these guidelines, some developers have been violating these rules especially on the aspect of number of storeys. Some buildings were observed to have 10 storeys in an area that was earmarked for 5 to 7 storey buildings (Figure 4). This situation has been caused by partly the weak enforcement of the guidelines and on the other hand, developers' urge to maximize use of plot. In the three blocks where detailed studies were conducted, while the number of single storey houses was 9 out of 14 in Block 47 in 2006, all the single storey houses were phased out in 2014. Many building are being transformed from typically single storey residential to multi storey commercial residential and office functions. Redevelopment trends in Block I were relatively slow apparently because of its peripheral location from the commercial centre (Table 2).

#### 4 c) Floor Area Ratio (FAR)

The minimum Floor Area Ratio (FAR) ranged from 0.1 to 0.5 in block I and 47. The recommended Floor Area Ratio for commercial buildings was 5.3. and 3.6 for residential cum commercial uses. One building on plot 6 Block 43 had a Floor Area Ratio of 8.4. This is a case of violation of the approved ratio of 5.3. Further observations in the areas zoned for residential cum commercial revealed an average Floor Area Ratio that ranged between 4 and 5 as compared to the recommended ratio of 3.6. This pattern of development contributes to informal vertical development in Kariakoo (Table 3).

Volume XIV Issue VIII Version I Fieldwork results from Kariakoo indicate that the majority of the plots had higher plot coverage of over and above those recommended in the guidelines. While the recommended maximum coverage was 70 percent, results from field observations indicate that out of a total of 37 plots, 16 plots had 80 to 90 per cent and 15 plots had 71 to 80 per cent coverage. Two buildings had plot coverage of 90 to 100 percent (Table 4). In general terms, 89 percent of all buildings had plot coverage exceeding ratios recommended in the Redevelopment Scheme of Kariakoo. These findings indicate that building developers are not adhering to guidelines as stipulated in the redevelopment plan. The effect of excessive plot coverage is culminating into problems associated with limited capacity to attend emergency measures such as fire rescue, poor ventilation and poor sunlight in the interior rooms. In terms of land coverage at block level, Block I had the highest coverage of 83 percent followed by Block 43 with 77 per cent and block 47 that had 73 percent (Table 5). These ratios are again over and above the recommended coverage of 70 percent.----- 1 1 3 1 2 2 - 1 ---- 4 1 2 4 -- 1 --- 5 1 2 2 - 1 3 -- 1 6 1 3 3 1 1 2 --- 7 - 1 1 1 1 1 1 1 1 8 - 1 1 -- 1 --- 9I 0.1-0.5 -- 0.5-1.0 2 - 9 1.0-1.5 --- 1.5-2.0 -- 1 2.0-2.5 - 2 - 2.5-3.0 - 3 - 3.0-3.

Although house form in Block I was still dominated by single storey houses the horizontal extensions has culminated into higher plot coverage. Higher plot coverage is contributing to uncomfortable indoor living The emerging spatial growth pattern in Kariakoo depicts a compact settlement of building with varying heights, size

163 and plot coverage. Although the trend in densification is in line with the view towards optimizing land and  
164 infrastructure use in Kariakoo, excessive compactness of buildings closely juxtaposed to each other is resulting  
165 into poor spatial qualities of the indoor living environment. Controls on the limitation of building height and  
166 coverage seem to have failed. The fact that development is taking place on plot-by-plot basis, the skyline is  
167 broken depicting what can be called "informal vertical landscape". View from side balconies is blocked due to  
168 narrow building side set-backs and side spaces cannot be used for any meaningful function. Tall buildings are  
169 casting shadows on adjacent buildings and streets resulting into dark corridors (Figure 7d). This spatial growth  
170 pattern is not sustainable when spatial quality requirements of visual, indoor sun lighting, skyline, space between  
171 buildings and cross ventilation are taken into consideration. Until 2014, the municipality of Kinondoni was yet to  
172 develop building densification guidelines for Sinza neighbourhood. Results from interviews with the Kinondoni  
173 Town Planner revealed that on average, they were receiving 3 to 10 applications for change of land and building  
174 use from residential to commercial from Sinza. In absence of a guiding framework for building redevelopment,  
175 plot coverage and floor area ratio were determined by using Government Notices, Orders and Circulars issued by  
176 the Ministry of Lands, Housing and Human Settlements Development of 1996. These guidelines are used to make  
177 decisions on plot by plot basis and as per specific requirement submitted by the plot developer. The Government  
178 Notice Number 157 of 16 th May 1996 provides for the following guidelines as summarized in Table 6.

### 179 5 b) Changing landscape of building heights in Sinza

180 Sinza was designed as a residential settlement for low-income people under the site and services schemes of the  
181 1970s (Bhayo 2014;Lupala, 2002). The standard plot size was 288 square metres. By that time, this was the  
182 smallest plot size which was considered affordable by the low income people. Starting from mid 1980, commercial  
183 uses started to emerge in Sinza. These included retail shops, guest houses, hotels, small groceries, restaurants,  
184 service industries, social halls and boutiques (Lupala, 2002). In blocks A, D and E, 15 per cent of all buildings  
185 had been transformed from residential to residential cum commercial uses. Middle and high income people have  
186 been buying off low income people and reconstructing larger high-rise commercial residential buildings. The  
187 changing landscape of Sinza is largely attributed to the increase in land value following the establishment of the  
188 Mlimani City commercial complex and completion of the Sam Nujoma highway that marks the border with Sinza.  
189 As the case was for Kariakoo redevelopment is carried out is piecemeal and on plot-by-plot bases. While the  
190 original houses forms in Sinza were predominantly single storey residential buildings, increasingly, commercial  
191 and high-rise buildings of 6 to 10 storey buildings are emerging. Although this pattern of settlement development  
192 maximizes land uses, it also poses potential challenges to spatial qualities. The fact that plot sizes in Sinza are  
193 relatively smaller than those of Kariakoo, unguided building redevelopment is likely to lead into crammed housing  
194 with adverse effects on urban spatial qualities.

195 Volume XIV Issue VIII Version I The newly emerging buildings in Sinza are multi-storey but are still scattered  
196 and isolated to form a continuous skyline. The isolated buildings pose a threat of privacy to the surrounding  
197 low rise houses because people in the high-rise houses can have a view of indoor and outdoor activities taking  
198 place in the low-rise houses. If this trend will continue unchecked, the challenges of loss of privacy, blocked cross  
199 ventilation and sun lighting will be more apparent than the case is in Kariakoo.

### 200 6 d) Floor area ratio

201 The Floor Area Ratio (FAR) for Sinza was revealed to range from 0.1 to 0.5 in block A, D and E.

202 Most of the buildings had FAR of between 0.5 and 1.0 and only two commercial buildings in block A and D had  
203 FAR of 3.5 and 5.5 (Table 6). Based on redevelopment guidelines relevant to Sinza, the maximum recommended  
204 FAR for residential plots is 0.7. As for commercial developments, the recommended FAR is 2.5. As was the  
205 case for Kariakoo, developers in Sinza were also violating the approved guidelines motivated by the urge of  
206 maximizing plot use. (Table 7)). Although the extent and number of high-rise buildings in Sinza is still limited,  
207 the emerging isolated cases pose a challenge on how new buildings development should be managed to contribute  
208 toward compact city without compromising liveability and spatial qualities.

209 Source: Bhayo, May 2014 e) Plot coverage in Sinza Results from field observations and measurement revealed  
210 that 15 out of 39 plots had plot coverage ranging between 51 and 60 per cent. The trend diminishes as coverage  
211 increase or diminishes around this figure. Only a few plots had higher coverage ranging from 91 to 100 percent.  
212 The latter represent newly constructed building (Table 8). The recommended maximum plot coverage for offices,  
213 shops and service trade is 70 percent and for residential categories is 50 percent. Again this shows the tendency  
214 of having plot coverage exceeding the recommended standards. The established land coverage in blocks A and  
215 D was 54 per cent, while in block E was 56 per cent. The small variation in land coverage in Sinza at block  
216 level is attributed to the standardized plot and block size with smaller house sizes. In Kariakoo, there was a  
217 significant variation in plot sizes from one block to another (Table 9). Although the skyline of Sinza is still  
218 dominated by single storey houses, isolated cases of high-rise buildings are protruding as monuments breaking  
219 the skyline amidst low-rise buildings. In terms of plot and block coverage, the present pattern indicate a modest  
220 coverage of about 50 percent. This creates a harmonious living and working environment with visual impressions  
221 within human scale. However, one of the potential challenges that is ahead of building redevelopment in Sinza  
222 is the small plot sizes which limits flexibility in designing functional multi storey buildings. For example the tall

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223 building in Block A (with 10 storeys) could be developed better if more than one plot were combined to provide  
224 ample surrounding spaces (Figure ??1b). If it happens that adjacent plots will also developed in the same form,  
225 then the future spatial pattern will be too compact to provide the requisite qualities of sun lighting, ventilation,  
226 view and comfortable indoor living and working environment. Even though the spatial extent of growth of Dar  
227 es Salaam has reached as far as 32 kilometres, the revealed density gradients values are still as low as 20 percent  
228 at 15 kilometres for the year 2012. Compactness of the city is notable within a distance of less than 10 kilometre  
229 distance with density gradient values being more than 40 percent. If the 50 percent compactness is considered as  
230 optimal in most of the redevelopment schemes, only settlements developed within a distance of 5 kilometres from  
231 the city centre reveal this threshold. Arguing from compact development point of view or jaggedness, the city  
232 compactness is still too low to guarantee city spatial sustainability in terms of effective utilization of land and  
233 infrastructure. In other words, the city has sprawled horizontally with larger parts beyond the 5 kilometre radius  
234 having low land coverage. Based on similar premises for Dar es Salaam City, Lupala (2007) observed as follows;  
235 "if the number of storeys in the low rise house types areas could be doubled, the extent of the built up area for  
236 the city could be reduced from 57,211 hectares to only 11,331 hectares. Similarly the horizontal expansion of the  
237 city could be reduced from 30 kilometres to 14 kilometres radii". In other words the study indicated that house  
238 forms (low rise or high rise) had a significant contribution in urban sprawl compromising spatial sustainability  
239 of Dar es Salaam City.

240 In both cases, (Kariakoo and Sinza), it has been noted that the guidelines for building redevelopment are  
241 inadequate, and where availed, they were being violated with limited or no control from the concerned authorities.  
242 This has been revealed in terms of developers constructing buildings with more number of storeys, more plot  
243 coverage and floor area ratios than those recommended in the guidelines.

244 Excessive plot coverage especially in hot and humid climatic zones like Dar es Salaam not only undermine  
245 spatial quality requirements for sun lighting, cross ventilation and view but also contributes to excessive use  
246 of electricity energy (Table 9). Electricity was usually put on during day times because of the shadows and  
247 darkness casted by tall buildings in Kariakoo. Reporting findings from Kariakoo, Monterroso (2008) wrote as  
248 follows; "comfort in indoor living environment was largely dependent on orientation of openings. For buildings  
249 that had windows on the sides, natural sun lighting was blocked creating dark spaces and compelled residents to  
250 use electricity light during day times. This was caused by the compact siting of building closely juxtaposed from  
251 one another".

252 Volume XIV Issue VIII Version I

## 253 **7 VIII. Conclusion and Recommendations**

254 It is apparent from the foregoing discussion that building densification is one of the key parameters for achieving  
255 compactness and sustainability. While compactness can be achieved both by increasing coverage and floor  
256 area ratios, this approach ought to be careful designed, guided and controlled to avoid the negative externalities  
257 emanating from crammed development. The cases of Kariakoo and Sinza serves to illustrate the fact that without  
258 proper guidelines for building densification process and effective development control, initiatives for achieving  
259 spatial sustainability in cities will not be realised. The potential challenges associated with unguided building  
260 densification have been revealed to include; blocked ventilation, loss of view, loss of privacy, broken skyline and  
261 creation of unused spaces between buildings. On the basis of these observations and empirical findings from the  
262 two cases the following are recommended. Firstly, there is a need of identifying all areas potential for building  
263 densification and preparing redevelopment schemes will guide the densification process. Secondly, there is a need  
264 of establishing effective urban development control mechanisms to see to it that the <sup>1</sup>

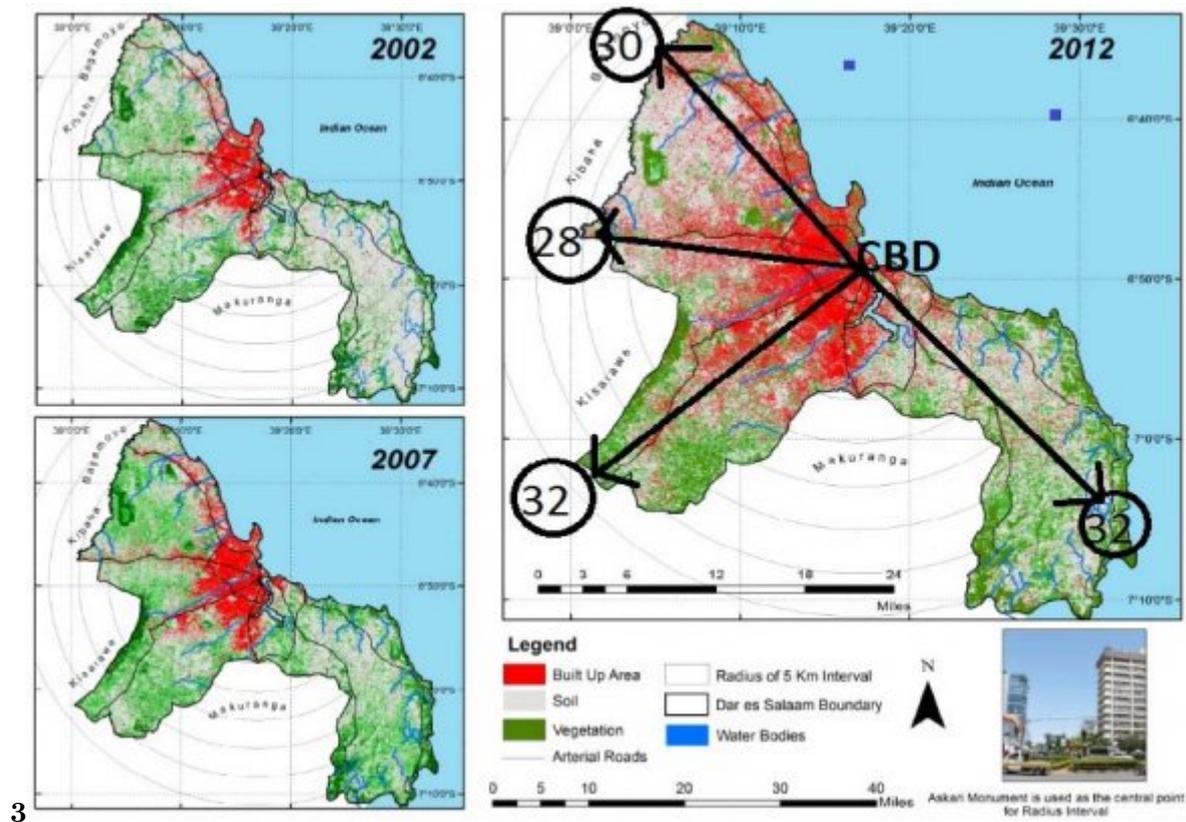
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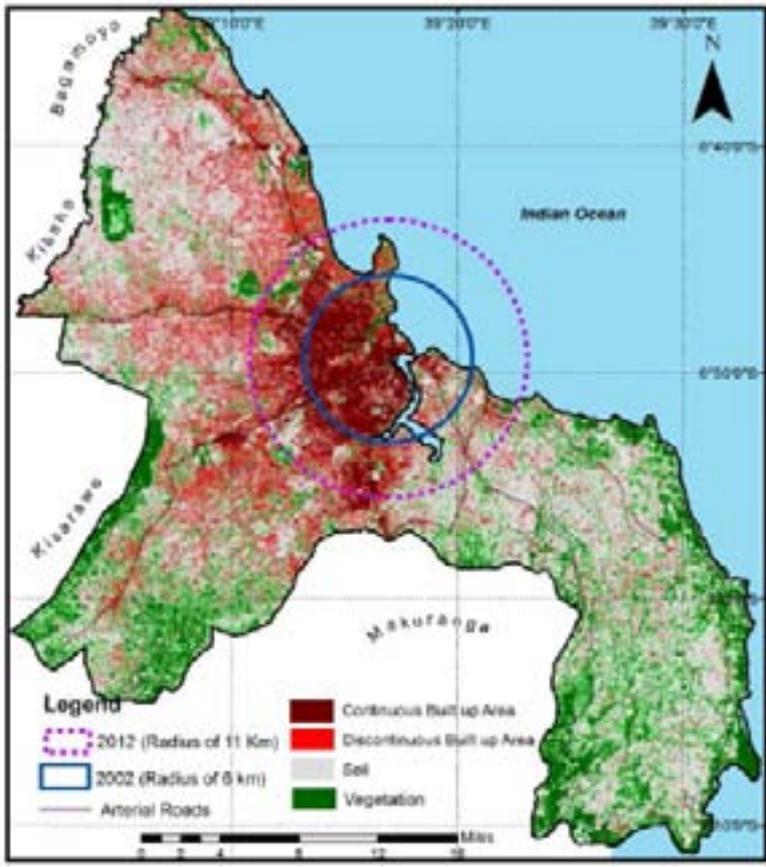
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Figure 1: Figure 1 :Figure 2 :



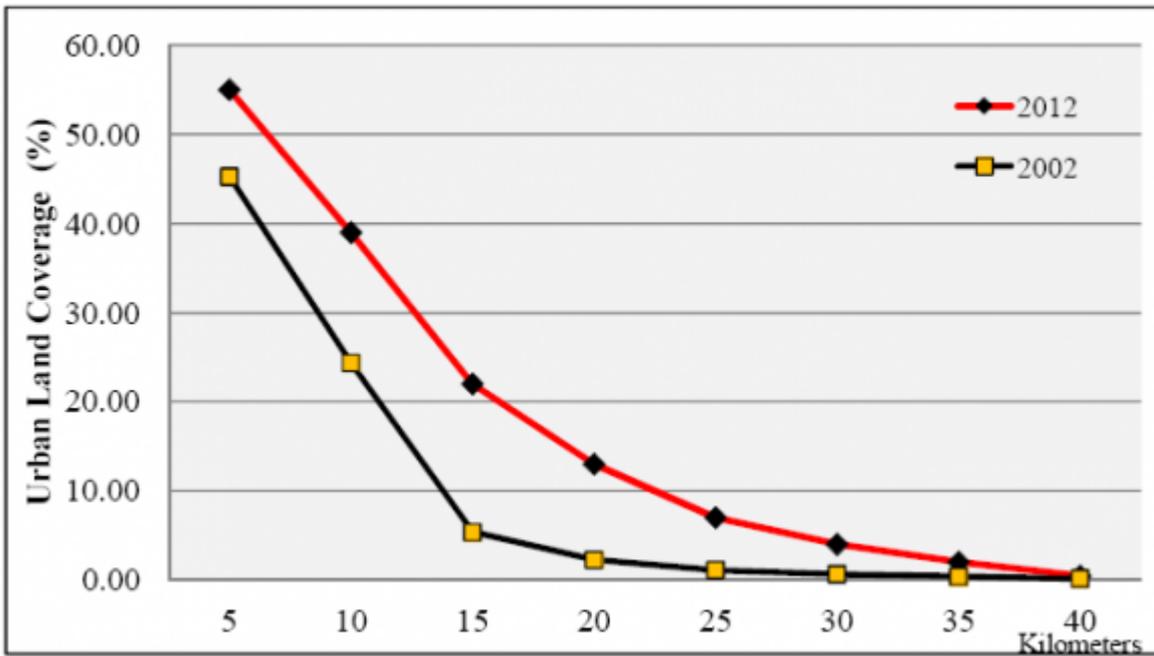
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Figure 2: Figure 3 :



4

Figure 3: Figure 4 :



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Figure 4: Figure 5 :Figure 6 :

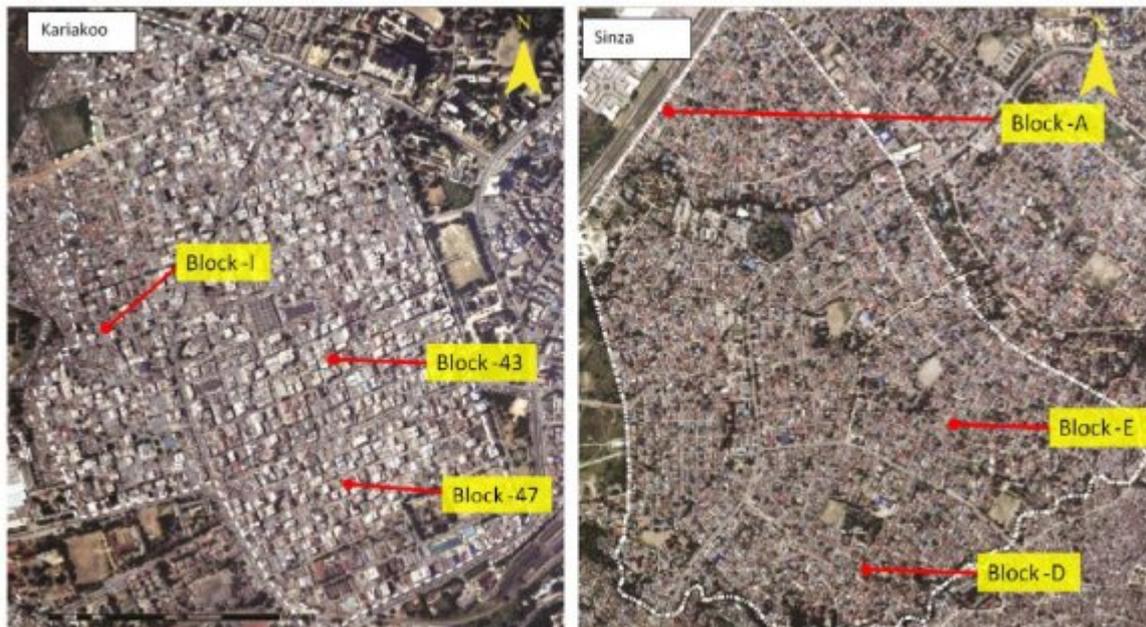


Figure 5:



Figure 6: Figure 7d :

7c

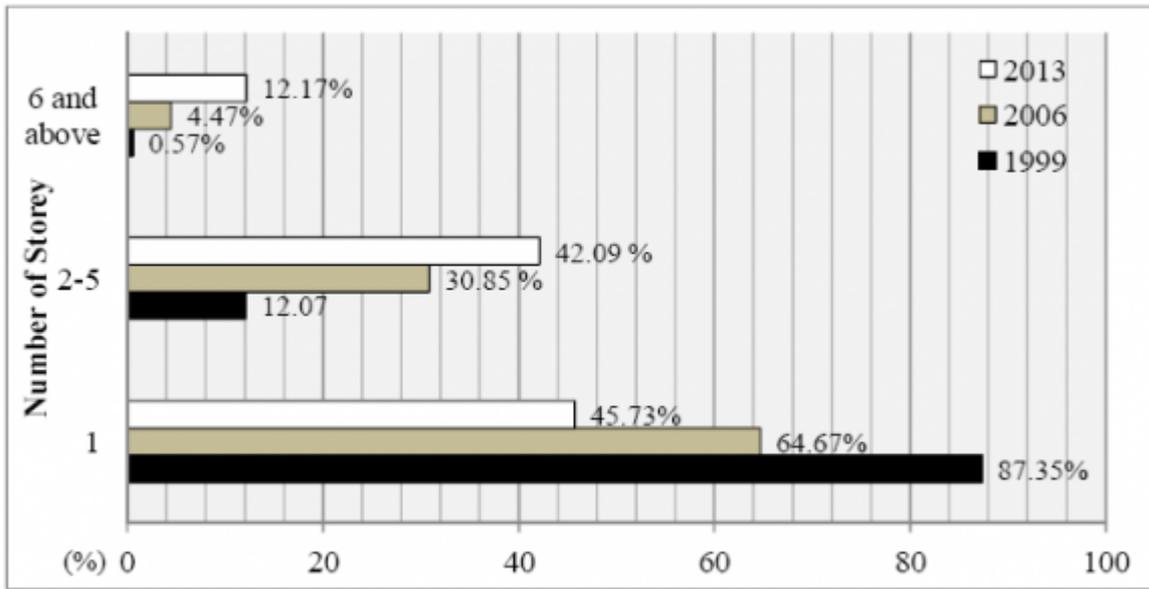


Figure 7: Figure 7c :

8a



Figure 8: Figure 8a :



8b

Figure 9: Figure 8b :

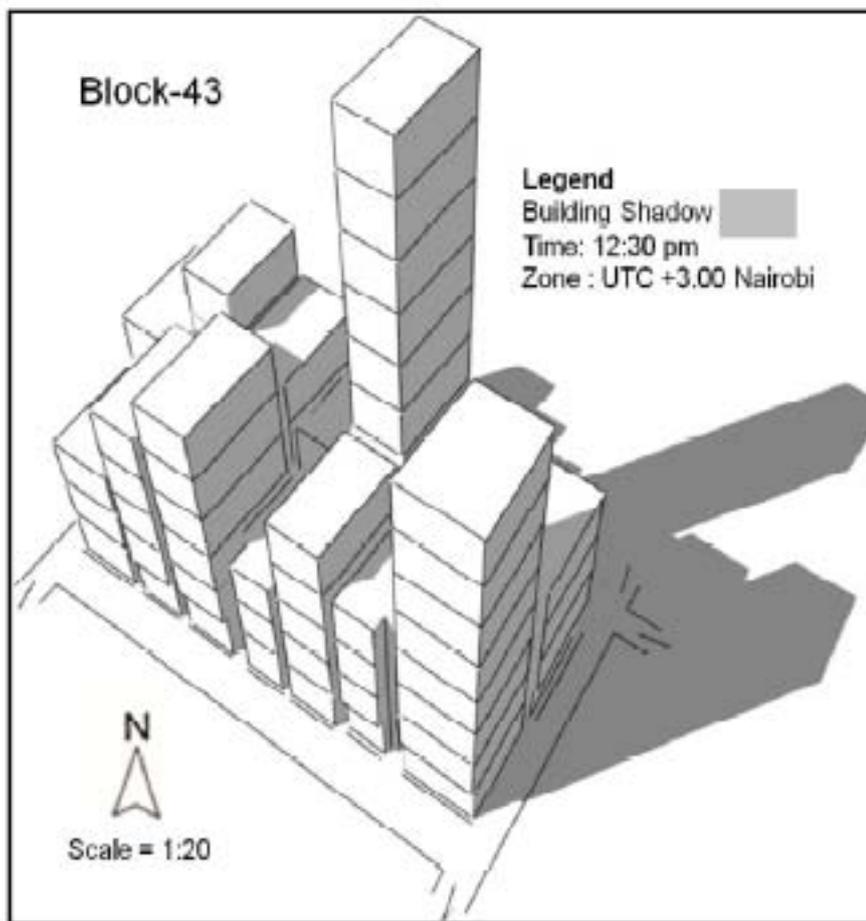


Figure 10:



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Figure 11: Figure 10 :



11a12a

Figure 12: Figure 11a :Figure 12a :



14b

Figure 13: Figure 14b :

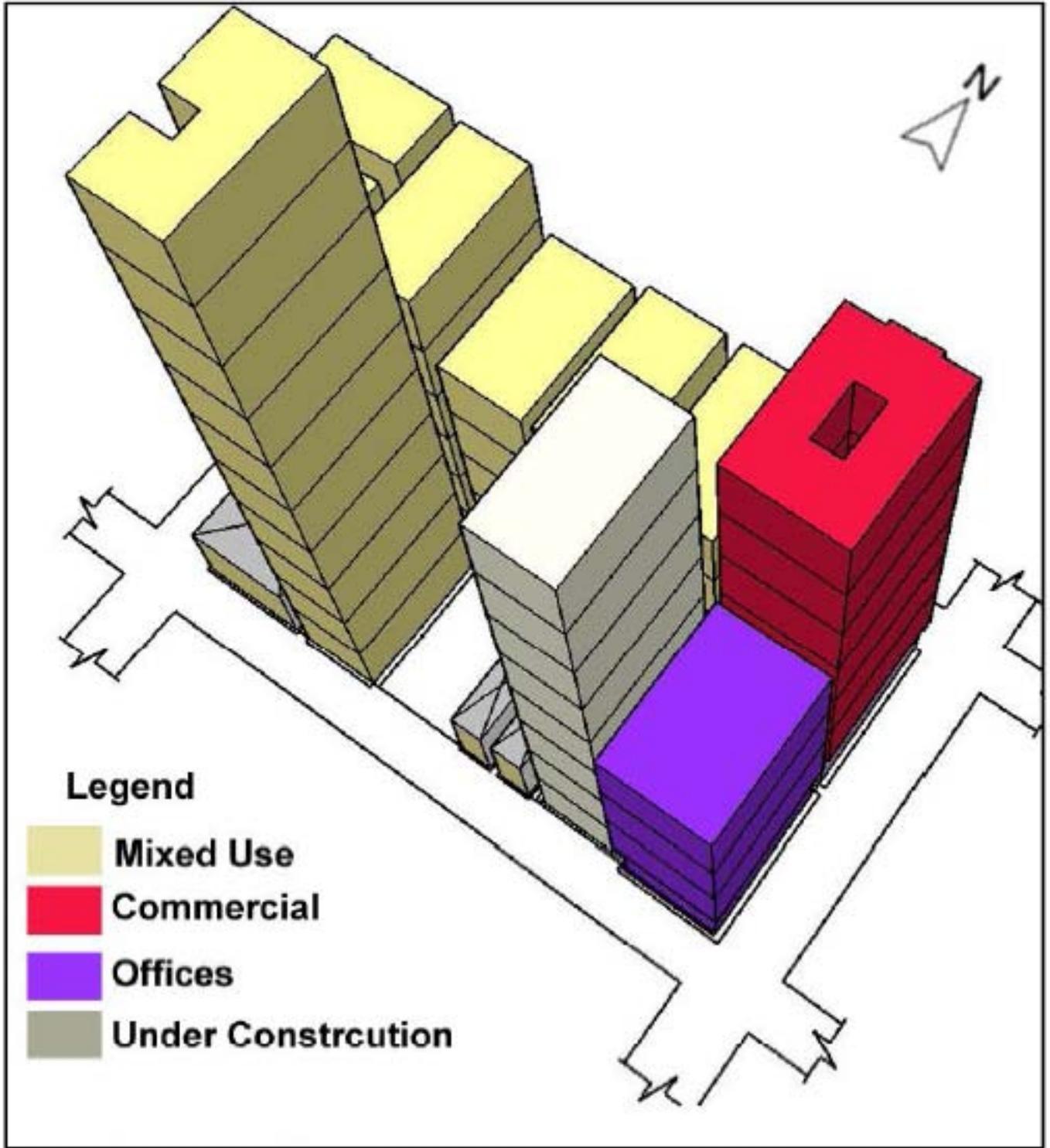


Figure 14:

Figure 15: Table

## 7 VIII. CONCLUSION AND RECOMMENDATIONS

1

Land use	Plot Coverage (%)	Coverage	Maximum Plot Ratio	Building height (storeys)	Minimum plot size (m <sup>2</sup> )
Commercial	66-70		5.3	8-10	900
Commercial residential I	60		3.6	6-8	600
Commercial residential II	60		1.2	3-5	380
Institutional buildings	30-50		1.0	1-2	15000
Other Institutions	50-60		2.5-3.3	5-7	1200

Figure 16: Table 1 :

2

Number of storeys	Block 43			Block 47			Block I		
	2006	2010	2014	2006	2010	2014	2006	2010	2014
1	9	2	-	10	8	3	11	10	9
2									

Figure 17: Table 2 :

3

and above	1	1	1	-	-	1	-	-	-
Total	14	14	14	12	12	12	12	12	12
Source: Bhayo, May 2014									
FAR			Block 47			Block 43			Block

Figure 18: Table 3 :

4

Plot coverage (%)	Number of plots	Percentage
50 or less	-	-
51-60	-	-
61-70	4	10.8
71-80	15	40.5
81-90	16	43.2
91-100	2	5.4
Total	37	100.0

Source: Bhayo, May 2014

e) Land coverage at block level

Figure 19: Table 4 :

5

Block	Total area (m2)	Total built up area	Land coverage per block (%)
43	4207.48	3226.87	77
47	4295.84	3135.65	73
I	3140.86	2615.89	83

Source: Bhayo, May 2014

f) Spatial growth pattern in Kariakoo

Figure 20: Table 5 :

6

A	ZONE I RESIDENTIAL						ZONE II SHOPS AND OFFICES		ZONE III SERVICE TRADE		ZONE IV		ZONE V		ZONE VI	
	B	C	D	E	F	G										
	Detached houses	houses	Terraced	Multi storey/Block of Flats			Multi storey	One storey	Multi storey	One storey	Gen storey	Spec induc	Public build.			
	HD	MD	LD	HD	MD	LD										
Min Plot size	372	930	139	112	930	930	27		279	233	233	233	-	-	-	-
FAR	0.4	0.2	0.2	0.5	0.7	0.6	0.3	2.5	0.71/0.51	-	-	-	-	-	-	-
Max coverage (%)																

Figure 21: Table 6 :

7

Figure 22: Table 7 :

8

Plot coverage	Number of plots	Percentage of total plots
0-30	1	2.6
31-40	5	12.8
41-50	8	20.5
51-60	15	38.4
61-70	5	12.8
71-80	3	7.7
81-90	1	2.6
91-100	1	2.6
Total	39	100.0

Source: Bhayo, May 2014

f) Land coverage at block level

Figure 23: Table 8 :

9

Block	Total block area (m2)	Total built up area (m2)	Land coverage (%)
A	3504	1906	54
D	3288	1781	54
E	4717	2651	56

Source: Bhayo, May 2014

g) Spatial growth pattern in Sinza

Figure 24: Table 9 :

Issue	Kariakoo	Sinza	Emerging issues
Building	? Guidelines were stipulated	? There was no scheme to	? Developers were violating
densification	the Kariakoo Redevelopment Scheme (2002)	guide building densification	guidelines on coverage AND FAR
guidelines	? Zoning plan for building height, coverage provided	? Government notices,	? There was weak enforcement of guidelines
Changing?	Rapid transformation	circulars were used as guidelines	? Although densification leads
landscape	started in 1990s	? Still in its infancy stages of transformation	towards compact development, spatial qualities are largely being compromised.
in building	? Densification has reached 'saturation stage'	? High rise buildings are isolated and scattered	Developers recommended standard in urge of maximizing plot use.
heights			
Floor Area Ratio (FAR)	? Recommended maximum FAR was 5.3	? Recommended maximum FAR was 2.5	
Plot Coverage	? Observed maximum FAR was 8.4	? Observed maximum FAR was 5.5	
	? Recommended maximum plot coverage was 70 percent	? Recommended maximum plot coverage was 70 percent	Developers recommended standard in urge of maximizing plot use.
	? Observed maximum coverage was 100 percent	? Observed max coverage was 100 percent	
Land coverage at block level	If recommended guidelines were followed, land coverage at block level was supposed to be 70 percent	If recommended guidelines were followed, land coverage at block level was supposed to be 70 percent	Excessive land coverage leads to excessive compactness, loss of comfortable indoor living
Spatial growth pattern	Broken skyline due to varying building heights	Isolated cases of tall building with predominant low rise house forms	Broken skyline leads to poor visual spaces, development and loss of privacy for low rise house forms

Figure 25: Table 9 :



recommended guidelines are followed by developers. Thirdly, in designing and redeveloping areas that command higher land values, the possibility of combining more than one plot should be considered. This will provide flexibility in design and address some of the spatial quality challenges that were identified in Kariakoo and Sinza.

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## 7 VIII. CONCLUSION AND RECOMMENDATIONS

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