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Influence of urban land markets on emerging city form.

A case of Dodoma national capital city in Tanzania.

[1]Azor William Nyakamwe, [2]John Modestus Lupala, [3]Emmanuel Elifadhili Mchome.

[1]Master Student, School of Spatial Planning and Social Sciences, Ardhi University, Email: williamazor@gmail.com, Dar es Salaam, Tanzania.

[2] Associate Professor, School of Spatial Planning and Social Sciences, Ardhi University, Email: lupalajohn@yahoo.com , Dar es Salaam, Tanzania.

[3] Senior Lecturer, School of Spatial Planning and Social Sciences, Ardhi University, Email: emamchome@gmail.com , Dar es Salaam, Tanzania.

ABSTRACT

Context and background

Presently, one of the major challenges confronting the growth of rapidly urbanizing cities is the fact that, cities are growing in unsustainable form which is largely market-led growth and suffers from informal land market distortions. From a conventional point of view, planning aims at achieving compact growth. At the moment, The pervasive knowledge gap especially inadequacies in theoretical premises and polices on city forms and have contributed to mixed forms in many cities of the urbanizing world. Extensive literature expounding on practical problems related to ineffective planning interventions is also scanty.

Goal and Objectives:

This paper is an attempt to exploring the implications of urban land markets on the emerging city form, it aims at examining theoretical premises with regard to influence of urban land markets on city form transformation in rapidly urbanizing cities context.

Methodology

This paper drew empirical evidences from four (4) settlements located in broad acre policy areas in Dodoma National Capital City. Mixed approach was adopted in which both, qualitative and quantitative data were collected. Data were collected using official and household interviews, focus group discussions, measurements and observations.

Results

The study findings reveal that informal land buying and selling, informal plot subdivision and densification, informal change of land uses and unregulated land price inflations have contributed to the consolidated city form on areas closer to public services and Central Business District (CBD). The findings further reveal that there is sprawling city form in areas far from public services, infrastructure and CBD. As a way forward it is recommended that, there is a need to revisit policies, legislation and guidelines governing city planning towards agglomeration of settlement centres and provision of services and infrastructure. It is also recommended that there is a need to redevelop areas along main roads and identify areas for infill development and establish special guidelines advocating compact city development.

Keyword

Land market, City form, Compact growth, Sprawling growth and sustainable

1. INTRODUCTION

In rapidly urbanizing cities where planning interventions is limited, the operation of land markets seems to influence the emerging city form in terms of land use patterns, density characteristics, transport network and building forms (Jones, 2004). Cities in developing countries suffer from land market distortions caused by increased rate of urbanization. The rate of urbanization is largely influenced by increased population, increased demand for urban land in peri-urban areas, inadequate land development and management. These factors contribute to unplanned development of land in the peri-urban areas (Gupta, 2017). The unregulated growth of city form influenced by informal land markets is limited in terms of intermixture of land uses (Serra, 2015). In peripheries, plots are often laid out in a haphazard manner with little or no provision of communal facilities and basic infrastructures (Opoko1, 2018).

In Tanzanian context, there is evidence that both formal and informal land markets do exist. However, the formal land delivery system plays a marginal role in the provision of urban land, the majority of land developers get access to land by way of informal land buying in the informal settlements (Kironde, 2000). This paper is an attempt to exploring the implications of urban land markets on the emerging city form of Dodoma National Capital City. It examines the factors behind heated land markets in broad acre policy areas along the four main roads of Arusha, Dar es Salaam, Iringa and Singida. This paper aims at examining theoretical premises on the influence of urban land markets in the process of city form transformation in rapidly urbanizing city context. This paper also informs policy makers and practitioners on the operations of land market in informal settlements and the need to re-orient and expand the scope of policies and legislations to regulate informal land markets.

1.1 Conceptual debate surrounding sustainable city form

Jones and Mac Donald (2004), Newman and Kenworthy (1989) and Cevero (2001) considered the compact cities as a sustainable urban form. They all argued that high development densities, mixed-use, high intense, high-rise development and efficient transportation links have social, environment and economic benefits that represent a compact and sustainable city form. However, other scholars have argued against a compact development as sustainable city form. Breheny (1992) for example argues that compact city means a reduction in environmental quality through the loss of open spaces to development potential to diseconomies i.e., congestion externalities. Knight (1996) argues that, compact city may be less desirable for individual with large household size (children) who may prefer to settle far from the city centre where they can have garden. Camagni *et al*. (2002) argue that, a combination of the compact and sparse urban form should be adopted. Frey (1999) concurs with the above views calling such forms as “decentralized concentration”. Parr (2004) argues that polycentric structure promote link between industries cluster and encourage innovation and economic growth through competition. Regardless of the above debate, Williams (2000) has a notable view; she found indirect evidence that the overall economic viability and vitality of a city increased in a compact urban form than in dispersed and polycentric based on a study of three boroughs in London.

1.2 Sustainable urban form; meaning types and elements

According to Anderson and Miller (1996), the concept 'urban form' can be used simply to describe a city's physical characteristics. In a broader city or regional scale, urban form has been viewed as the spatial configuration of fixed elements. (Williams, Jenks, & Burton, 2000). Urban forms generally encompass a number of physical features and non-physical characteristics including size, shape, scale, density, land uses, building characteristics, urban block layout and distribution of green spaces and transport network (Dempsey, 2008). Lynch (1960) using a system of activity patterns described urban form to be characterised and constituted by key elements including types, quality, density, grain and spatial distribution.

Jones (2004), described two types of sustainable urban form, a compact urban form that advocates high density, high rise, mixed use and centralized form; the second is a sprawl urban form that advocates low density, low-rise and sector land use pattern. Frey (1999) and Parr (2004) argued on a third type of urban form, a polycentric urban form which combines the benefits of both compact and sprawl urban form as a sustainable city form. The concept of sustainable urban form as introduced by Jones and Mac Donald (2004) considers the underlying urban economic forces that determine the principal elements of a sustainable urban form. They are housing density, transport infrastructure, layout of development, building characteristics, and land use patterns.

Housing density represents the gross population, net residential, commercial and industrial densities. Density on the one hand can be seen as an outcome of the competition between land uses within a given urban transport infrastructure and its associated pattern of accessibility (Porta, 2009). Transport infrastructure refers to accessibility to buildings/ spaces/facilities. Transport infrastructure is closely associated with accessibility as it determines the ease with which buildings, spaces and places can be reached. It is therefore closely linked to land use and layout: on how services, facilities and open spaces are arranged within a city or neighborhood. (Jones and Mac Donald 2004). Layout of development refers to both urban grain and urban structure. Layout describes the spatial arrangement and configuration of elements of streets, blocks and buildings, often referred to as the street scale, such as grid or tree-like (cul-de-sac) street patterns. (Dempsey, 2008). Building characteristics refers to building types, building heights and intensity of land use. Intensity is distinguished from density here because it refers just to the footprint of the building(s) for instance, high rise flats would be considered as high intensity even if they are surrounded by green space. (Jones and Mac Donald 2004). Land use pattern refers to mixed and segregated land use. Patterns of land use are used to describe different functions of the environment. Within the urban context, the dominant land use tends to be residential but a functional urban area requires industrial, retail, offices, infrastructure and other uses. (Jones and Mac Donald 2004).

In Tanzanian context, policies, legislations and regulations have provided guidelines towards realization of sustainable city form. These policies include; the National Human Settlements Development Policy (2000), the National Land Policy (1995), the Urban planning Act No.8 (2007) and the Urban Planning Regulations (2018). Section 6.1.2(a) of the National Land Policy instructs planning authorities to zone out more areas of tows for vertical development where by more dwelling units will be accommodated in the residential plots of which vertical extension will constitute the principal building form. Section 4.1.4.2 (iv) of the National Human Settlements

Development Policy (2000) insists on timely planning, surveying and servicing of land ripe for urban development in peripheries of towns to prevent unplanned development and enhance the achievement of a sustainable city form. Section 29(i) of the Urban planning act (2007) restricts land owners from developing any land within a planning area without requests and grant of planning consent which is granted by the planning authorities. Section 6(1) of the Urban planning (use groups and use classes) of 2018 requires that, any change of land use shall aim at maximizing use of land, infrastructure, controlling urban sprawl and allowing for new investment to create employment. The implementation and enforcement of these legislations and policies is scanty in such a way that the realization of the anticipated goals advocating sustainable city form remains impractical.

2. METHODS

This paper is based on a study of the implications of urban land markets on the emerging city form of Dodoma National Capital City in Tanzania. The study was conducted between March and May 2021 in four (4) settlements of Miyuji, Ihumwa, Nkuhungu and Mpunguzi which are located along main roads to Arusha, Dar es Salaam, Singida and Iringa respectively. These settlements fall within areas that were designated as broad acre primarily to be used for urban farming during the implementation of 1976 Dodoma National Capital City Master Plan. Mixed approach was adopted in which both, qualitative and quantitative data were collected. Satellite images of different time periods, obtained through free source images from the United States Geological Survey (USGS) were compared and assessed to estimate the urban built-up area at different time intervals. The focus was to analyze trends of spatial development and to compare the results with trends of land market with respect to, price, demand and supply and market interaction information. Data were collected using household, official interviews and focus group discussions techniques. Observation and measurement techniques were deployed in analyzing number of buildings in a plot, building types, building heights and building footprints, while qualitative data including narratives on drivers, characteristics and forms of land market in the study area were collected using household interviews and group discussions. Survey sample was obtained by using a statistical model that was approved by the African Economic Research Consortium in Nairobi, and were proportionally distributed to 165 households with an average of 24 households for each settlement. probability sampling was adopted on selecting households for interview within settlements. Purposive sampling was adopted for focus group discussion and official interview, whereby, in each settlement 2 real estate agents were interviewed and 18 officials from Dodoma City Council's Lands Department were interviewed. Spatial data on the trend of spatial growth were analyzed by using GIS, while SPSS was used to analyze both qualitative and quantitative data.

3. RESULTS

Land price characteristics, demand and supply forms, land market forms as well as their trends over time period have been analyzed along with change in urban form elements including, land uses, densities, building characteristics, layout and transport infrastructure. In this paper, built-up area remains a key focus and has been analyzed by assessing its growth in terms of configuration (density and scatter), composition (patterns of land uses) and the land market forces influencing its development.

3.1 Influence of change in land price, demand and supply on residential development density.

Results from Official interview with Land Officers from the City Council revealed that from 1980 to 2021 land price has been increasing in both planned and unplanned areas (Tables 4.1and 4.2). However, a higher price increase is notable in planned areas as compared to unplanned areas. Further, results indicate that price for land along Arusha Road and Dar es Salaam Road is higher as compared to Singida and Iringa Roads in both planned and unplanned areas. The reason for higher land prices along Arusha Road is due to its proximity to CBD, physical development and infrastructures, while the higher price increase along Dar es Salaam Road observed to be influenced by its proximity to government city, central market and bus terminal. Table 1 and 2 shows that land price has been increasing in both planned and unplanned areas from 1980 to 2021.

Time	**Price of land per unit square meter (Tsh) in planned areas along four main roads**			
	Miyuji (Arusha road)	**Nkuhungu (Singida road)**	**Ihumwa (Dar es Salaam road)**	**Mpunguzi (Iringa road)**
1980	100	50	50	50
1990	600	300	250	200
2000	5,000	3000	3500	2500
2010	15,000	5,000	12,000	4,500
2020	55,000	15,000	40,000	17,000

Table 1: Land price trends in planned areas from 1976 to 2021.
Source: Official interview, June 2021

Time	**Price of land per unit square meter (Tsh) in unplanned areas along four main roads**			
	Miyuji (Arusha road)	**Nkuhungu (Singida road)**	**Ihumwa (Dar es Salaam road)**	**Mpunguzi (Iringa road)**
1980	10	10	10	10
1990	50	40	40	30
2000	200	100	150	100
2010	600	300	500	250
2020	2,800	2,500	3,000	2,000

Table 2: Land price trends in unplanned areas from 1976 to 2021.
Source: Official interview, June 2021

The results from household interview have shown that, as price and demand for land increased from 1980 to 2021, land owners have subdivided their farm plots into, smaller residential plots and sold them to new developers at high prices. It was reported that, increase in land price from 2010 to 2021 was influenced by the review of the 2010 master plan which allowed residential development in areas designated as urban farms by the 1976 master plan, the government decision of shifting its

functions from Dar es Salaam City to Dodoma Capital City in 2017, the resultant population increase which led to increase in demand for land as well as limited capacity by Dodoma City Council to supply land in the formal system to the resultant population. Further, results indicate that, 6.5 percent of respondents interviewed subdivided their farm plots between 2011 to 2018, while 69.8 percent subdivided their farm plots between 2018 to 2021. The increased farm plots subdivision from 2018 to 2021 was driven by regularization of informal settlements as well as the increased demand for residential plots and other urban land uses (Figure 4.1).

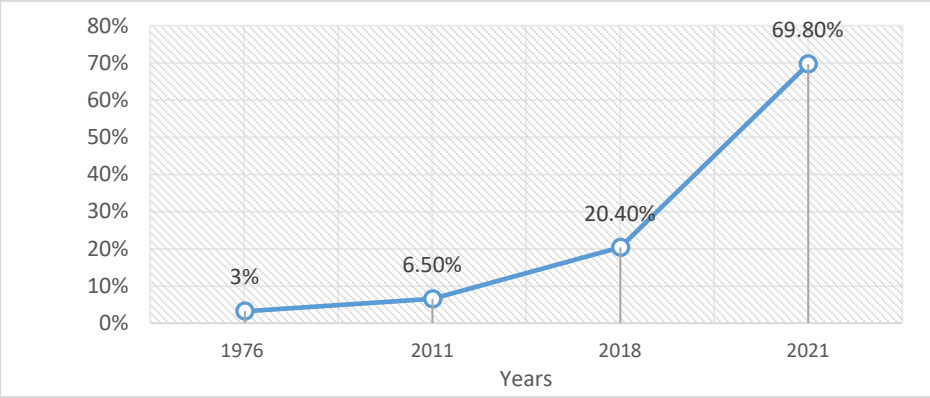

Figure 1: Trend of plot subdivision from 1976 to 2021
Source: household interview, June 2021.

The effect of demand and price increase on density has been analyzed in three ways, the first analyses the increase in number of plots per block, the second uses satellite images to analyses the number of buildings per hectare and the third uses population size per hectare by using National population census data of 2012.

3.2 Analysis of density increase using number of plots per block

Two blocks from Miyuji settlement were selected, one block was selected closer to the main road and the other was selected far from the main road. these blocks were used to assess changes in number of buildings from 1976 to 2021 using town plan drawings/layouts.

Plate 1and 2 shows that, in 1976 a block closer to main road had 2 farm plots and its price was 100 Tsh per square metre, while a block far from main road had 6 plots and the price was 50 Tsh per square metre. In 2020 plate 3 and plate 4 indicate that, the density in terms of number of plots increased from 2 plots to 147 plots and from 6 plots to 65 plots respectively. This has been influenced by an increase in price for all two blocks from 100 Tsh to 55,000Tsh and from 50Tsh to 24,000 Tsh per square metre respectively. However, the increase in number of plots observed to be associated with increase in price of land and was also observed higher in areas closer to main road which are expensive than those areas far from the main roads which are cheap. Development of settlements along these four main roads is characterized by high density plots increasing in sizes with increasing distance from the main transport routes. This implies that, development is forced in areas closer to infrastructures which are recognized as prime areas and are densely developed regardless of their relative prices.

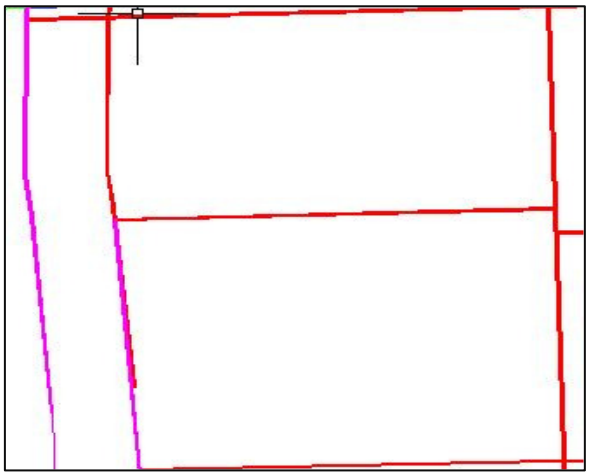

Plate 2: Block of farm plots closer to main road in Miyuji 1976

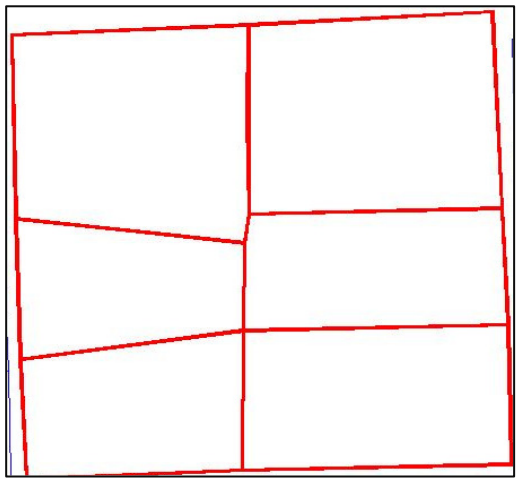

Plate 1: Block of farm plots far from main road in Miyuji in 1976

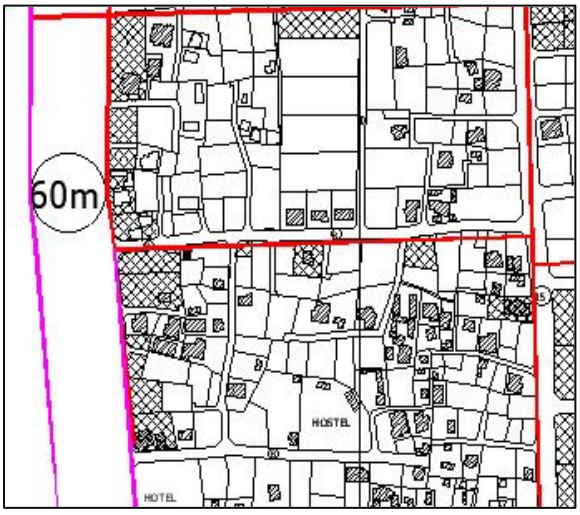

Plate 4: Block of farm plots far from main road in Miyuji in 1976

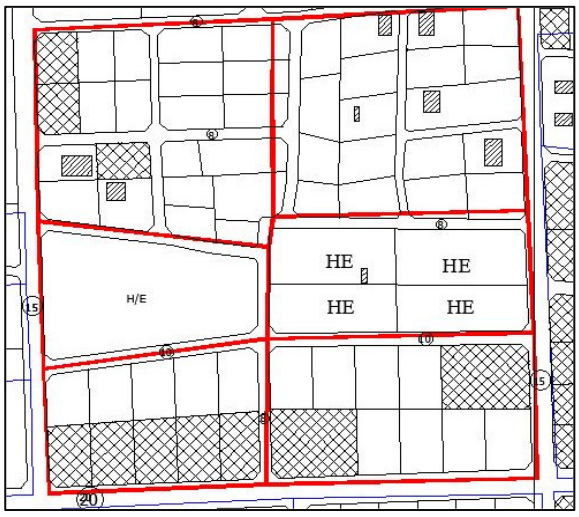

Plate 3: Block of farm plots far from main road in Miyuji in 2021

3.3 Analysis of density increase using number of houses per hectare

Further analysis on the effect of price and demand change on density was done by selecting blocks in built-up areas, from Miyuji and Nkuhungu and counting the number of houses from 2010 to 2021 from satellite images of 2000, 2010 and 2020 with the help of GIS as shown in Plate 5, Plate 6 and Plate 7. The results show that, in 2000 a block in Nkuhungu had zero houses per hectare, while a block in Miyuji had 1 house per hectare. In 2010 the block in Nkuhungu had 10 houses per hectare and that of Miyuji had 32 houses per hectare. In 2020 counting showed further increase from 10 to 28 houses per hectare in Nkuhungu and from 32 to 40 houses per hectare in Miyuji. These results imply that, house density has been increasing with increase in demand for land from 2000 to 2020. Further the results indicate that development is prominent along the main roads but more so on areas closer to CBD. These areas depict a consolidated urban form while areas far from main roads revealed lower density with sprawling urban form.

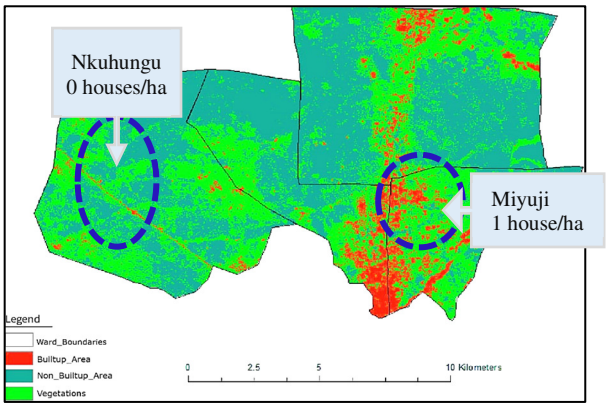

Plate 5: Built-up area in Miyuji, Nkuhungu and Mnadani in 2000

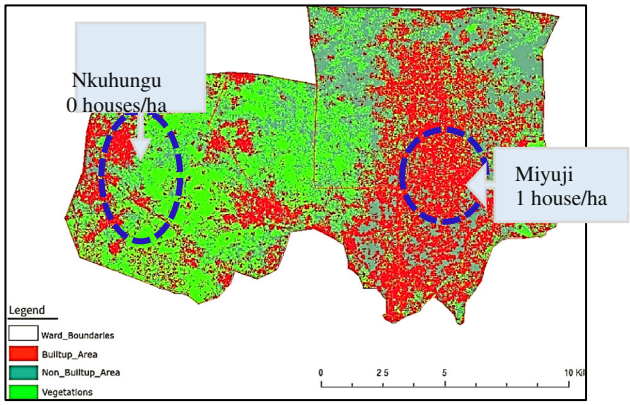

Plate 6: Built-up area in Miyuji, Nkuhungu and Mnadani in 2010

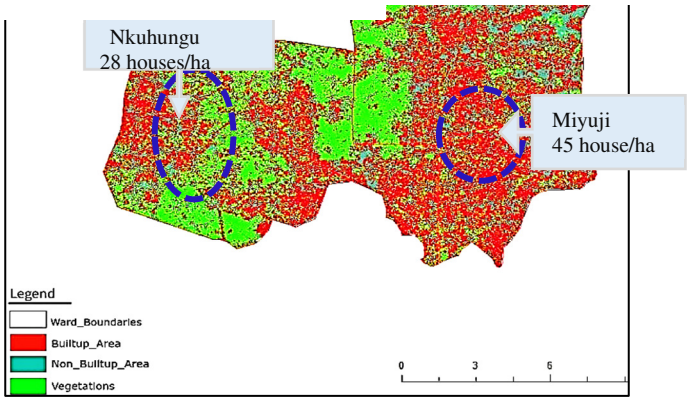

Plate 7: Built-up area in Miyuji, Nkuhungu and Mnadani in 2020

Furthermore, density increase was analyzed using data from National population census of 2012. The data were used to establish the number of households in the years 1980, 1990, 2000, 2010 and 2020. Figure 2 shows that Miyuji settlement experienced a high increase in housing density followed by Ihumwa and Nkuhungu. Mpunguzi had the least population density. Increase in density in Ihumwa settlements is influenced by the location of the government city at Mtumba, bus terminal and the central market at Nzuguni. These patterns of growth imply that development in Dodoma city is largely taking place along Arusha and Dar es Salaam Roads due to their comparative advantages in terms of proximity to CBD and public services such as schools, hospitals, reliable water and electricity. Increase in price along main roads has influenced development of mixed use, where rental residential, commercial and residential-commercial houses are preferably developed.

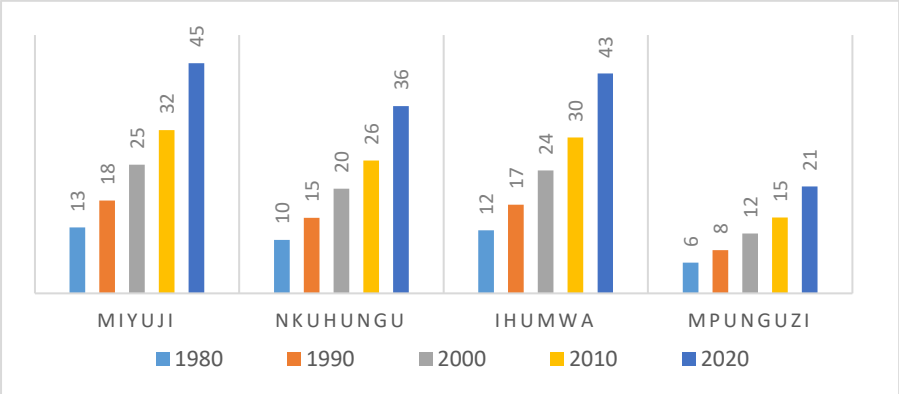

Figure 2: Trend of housing density from 1980 to 2020

Source: Official interview, 2021

3.4 Influence of land market on building characteristics

Result from observations showed that the type of buildings in the study areas was also influenced by location in respect to CBD, main road and services. Table 3 reveals that, along the main road, as land prices decreases in respect to distance from CBD, the number of semi-detached and row houses decreases too while the number of detached houses increases. Across all settlements, the percentage of semi-detached houses have been increasing from 3 percent in 1990 to 27 percent in 2021. The percent of row houses also increased from 1 percent in 1990 to 15 percent in 2021. Further, findings reveal that, the percent of detached houses has been decreasing from 96 percent in 1990 to 58 percent in 2021. It has been found that, about 42 percent of houses at Miyuji, Ihumwa, Nkuhungu and Mpunguzi settlements constitute of semi-detached, row houses and block of flats. This implies a high intense of plot development along the main transport routes. However, results show that, Miyuji settlement had a high increase in number of semi-detached and row houses followed by Ihumwa settlement as compared to Mpunguzi and Nkuhungu settlements. The reason behind higher increase in number of semi-detached and row houses at Miyuji was its proximity to CBD while location of the Government city in Mtumba, central market and bus terminal in Nzuguni settlement was observed to be the contributing factors for Ihumwa settlement. These results imply that, presence of public services along main roads attracts land owners to develop the type of houses that optimize land use and infrastructure namely; semi-detached and row houses for rental purposes. These results confirm the preposition that as distances decreases from public services land owners make effective, efficient and economic use of their lands by developing house types that optimize land values. Price increase being the contributory factor towards change in building types, most of land owners in prime areas due to high land price and high demand for housing opt to develop houses for rental purposes.

Year	Building Type	Miyuji	Ihumwa	Nkuhungu	Mpunguzi	Percent
1990	Detached	23	24	24	24	**96**
	Semi-detached	1	0	0	0	**3**
	Row-house	0	0	0	0	**1**
	Block of flat	0	0	0	0	**0**
Land price per Square metre (Tsh)		600	250	300	200	**100**
2000	Detached	17	19	22	22	**82**
	Semi-detached	5	4	1	2	**13**
	Row-house	2	1	1	0	**5**
	Block of flat	0	0	0	0	**0**
Land price per Square metre (Tsh)		5,000	3,500	3,000	2,500	**100**
2010	Detached	14	17	18	19	**70**
	Semi-detached	7	5	4	5	**21**
	Row-house	3	2	2	0	**9**

Year	Building Type	Miyuji	Ihumwa	Nkuhungu	Mpunguzi	Percent
	Block of flat	0	0	0	0	**0**
Land price per Square metre (Tsh)		15,000	12,000	5,000	4,500	**100**
2021	Detached	11	12	16	15	**58**
	Semi-detached	8	7	5	6	**27**
	Row-house	4	4	3	3	**15**
	Block of flat	1	1	0	0	**1**
Land price per Square metre (Tsh)		55,000	50,000	15,000	17,000	**100**

Table 3: Influence of price increase on building types for plots along main roads
Source: Observations, June 2021

3.5 Influence of land price on building characteristics

Analysis of the building heights was done by selecting four blocks from Miyuji, Ihumwa, Nkuhungu and Mpunguzi settlements that fall along the four main roads to Arusha, Dar es Salaam, Singida and Iringa respectively. The results revealed that, change in land prices over time and distance from main road and CBD insignificantly influenced the height of buildings in the study area. In these blocks, development of medium-rise and high-rise was insignificant as compared to development of single storey houses. However, medium and high-rise buildings observed along Arusha, Singida and Dar es Salaam Roads were offices mainly military, colleges and the government city rather than residential/commercial ones. Table 4 indicates that, there has been a notable increase in number of single storey houses mainly along Arusha and Dar es Salaam roads as compared to Singida and Iringa road. These results indicate that along these roads, housing development is more consolidated and compact.

Year	Building height	Miyuji	Ihumwa	Nkuhungu	Mpunguzi
2000	Single storey	52	41	31	24
	Low rise (1-4)	1	0	0	0
	Medium rise (4-6)	0	0	0	0
	High rise (above 6)	0	0	0	0
2010	Single storey	86	62	79	45
	Low rise (1-4)	3	0	2	0
	Medium rise (4-6)	0	0	0	0
	High rise (above 6)	0	0	0	0
2021	Single storey	512	418	213	187
	Low rise (1-4)	7	3	2	1
	Medium rise (4-6)	3	48	15	0
	High rise (above 6)	1	0	1	0

Table 4: Building height along main rod Source: observations, June 2021
Source: Observations, June 2021

3.6 Influence of land market on land uses patterns

Trends of land price, demand and supply from 1976 to 2020 which was observed to vary with location has influenced the pattern of land uses in the study areas. Results show that as price and demand decrease with increasing distance from CBD along main roads, the pattern of land uses has been changing from a sector pattern i.e., urban farming to mixed-uses (Figure 3). Results further show that Ihumwa and Miyuji settlements are rapidly transforming from sector to mixed-uses. These two settlements are changing faster than Mpunguzi and Nkuhungu. The latter have shown dominance of urban farming as a major and dominating land use. This implies that land price and demand decrease with increasing distance from CBD. Similarly, mixed land use increase with increasing proximity to CBD and services, while urban farming land use increases with increasing distance from CBD and services. The resulting city form along main roads is a mixed-use subscribing to a sustainable city form. While development far from services and infrastructure reveals development of unsustainable city form.

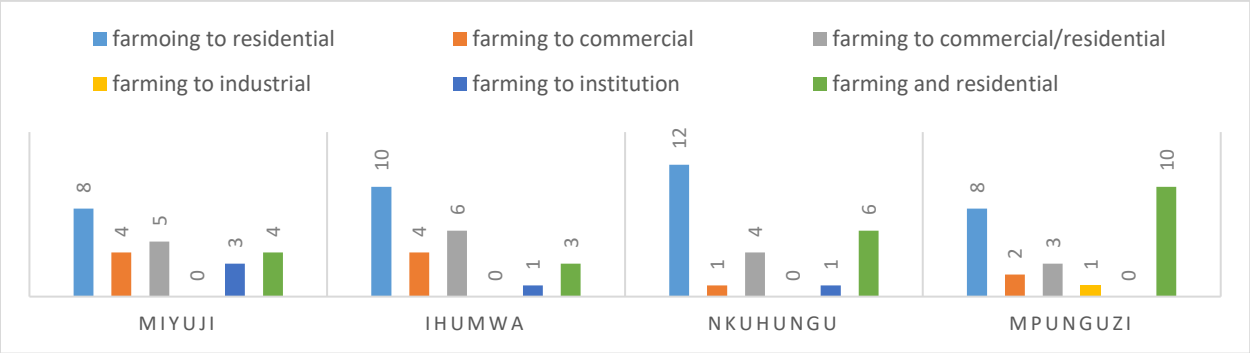

Figure 3: Trends of land use patterns in Broad acre policy areas from 1976 to 2021
Source: Observations, June 2021

3.7 Influence of land market on layout and transport network

Analysis using satellite images captured at different time periods with the 1980's being a base year show change in pattern of transport network from block/rectangle pattern to grid-rectilinear, tree-like and cul-de-sac patterns. In 1980's broad acre policy areas were designed in a block/rectangular pattern (Plate 9). Due to change in demand and price for land, areas where the broad acre policy was not implemented experienced a greater distortion in layout as compared to areas where the policy was partially implemented. Ihumwa, Nkuhungu and Mpunguzi settlements felt major distortions in layout and patterns of road network. The present layout describes a tree-like pattern taping to cul-de-sac in the peripheries of Dodoma city (Plate 10) Unlike Miyuji settlement where the broad acre policy project was partially implemented the pattern of layout appear to have upheld the original designs with minor changes associated with an increase in number of access roads as a result of increasing rate of plot subdivision (Figure 4.1) where the existing layout depicts a grid-rectilinear pattern (Plate 11). Where the policy wasn't implemented, the layout changed from grid to tree-like and subsequently cul-de-sac layout (Plate 4.12)/ These results imply that, in absence of effective

implementation of spatial plans, urban land market forces determine the pattern of transport networks and the overall city's configuration/layout.

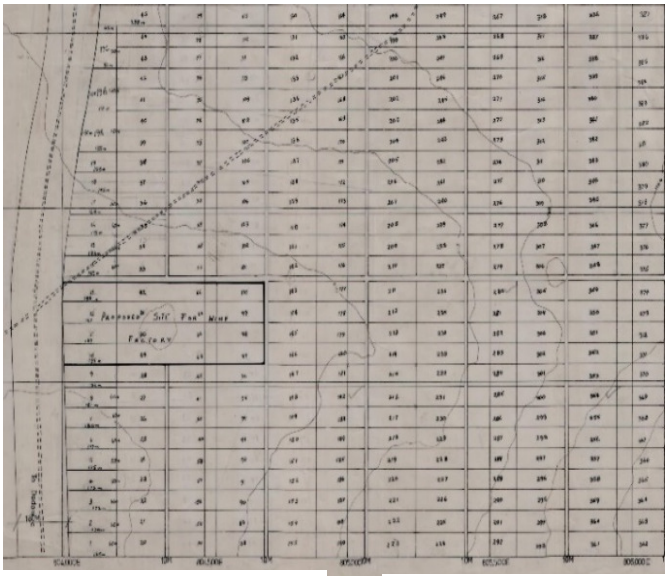

Plate 8: 1980's Miyuji layout plan -along Arusha Road
Source: Miyuji layout plan1980

Plate 9: Grid-rectilinear pattern changing to tree-like pattern
Source; Satellite image, 2021

Plate 10: Grid-rectilinear pattern in Miyuji settlement-along Arusha Road
Source; Satellite image, 2021

Plate 11: Tree-like pattern changing to cul-de-sac along Dar es Salaam, Singida
Source; Satellite image, 2021

4. DISCUSSION

4.1 Cross-case analysis

Analysis from the four settlements along four main roads revealed varying findings due to their locational, socio-economic and spatial variances. Land market operations also have a greater share on the emerging city forms. The major elements that constitute city form are density, land use pattern, layout, transport infrastructure and building characteristics. These elements are compared and analyzed with respect to influence of land market towards comprehending the general emerging city form of Dodoma National Capital City.

Briefly, house density was observed to be higher along Dar es Salaam and Arusha Roads which increased from zero house per hectare in 1980 to 43 and 45 houses per hectare in 2020 respectively. While density increase along Singida and Iringa Roads was observed to be low increasing from no house per hectare in 1980 to 36 and 21 houses per hectare in 2020 respectively The higher increase in density along Arusha Road is contributed by its proximity to the Central Business District (CBD), availability of infrastructure and services. Services such as health, education and institutional facilities are largely located along these roads. Increased density along Dar es salaam Road is also

contributed by development of government city in Mtumba settlement and construction of central market and bus terminal at Nzuguni. The lower increase in density along Iringa Road is a factor of its distance to (CBD), topographic constraints characterized by hills and valleys that constrain residential development.

Mixed land use is dominant along Arusha and Dar es salaam Roads while residential land uses was observed to be dominant in Nkuhungu and Mpunguzi settlements. While urban farming characterizes settlements of Miyuji and Mpunguzi and scattered residential houses characterize the peripheries of Ihumwa and Nkuhungu settlements. While rectilinear or grid layout were observed in Miyuji settlement due to the implementation of the broad acre policy in 1980's, tree-like and cul-de-sac layout patterns dominated layout of development at Ihumwa, Nkuhungu and Mpunguzi. This was a result in failure to implement the broad acre policy in the 1980's. Semi-detached houses were more dominant along Dar es Salaam and Arusha roads at Ihumwa and Miyuji settlements respectively as compared to Singida and Iringa roads at Nkuhungu and Mpunguzi settlements respectively due to an increasing demand for houses, while detached houses, single storey and low-rise houses are observed to be dominant in all settlements of Miyuji, Ihumwa, Mpunguzi and Nkuhungu. Medium rise and high-rise buildings are observed to be owned by government institutions rather than individual or private residential and commercial properties. These results imply that, along main roads in Ihumwa and Miyuji settlements a consolidated urban form was revealed while Nkuhungu and Mpunguzi settlements reveal a sprawling city (Table 5)

Settlement	**Density**	**Land use pattern**	**Layout and Transport network**	**Building characteristics**	**Implication to city form**
Miyuji (Arusha Road)	• Density increased to 45houses/hectare	• Mixed land use along main roads • Sector land use pattern in peripheries (urban farms)	• Change from block to grid pattern • Increased number of plots and access roads in a	• Development of semi-detached houses along main road. • detached houses dominate • single storey houses dominate	• Consolidated urban form along main roads • Insignificant vertical growth • Sprawling urban form in peripheries
Ihumwa (Dar es Salaam Road)	• Density increased to 43houses/hectare	• Mixed land use • Few urban farms in peripheries	• Tree-like pattern taping to cul-de-sac in the peripheries	• Development of semi-detached houses along main road. • detached houses dominate • single storey houses dominate	• Consolidated urban form in centres and along main road • Sprawling urban form in peripheries

Settlement	Density	Land use pattern	Layout and Transport network	Building characteristics	Implication to city form
Nkuhungu (Singida Road)	• Density increased to 36houses/hectare	• Residential land use dominates • Urban farms in peripheries	• Tree-like pattern taping to cul-de-sac in the peripheries	• detached houses dominate • single storey houses dominate	• Sprawling urban form in peripheries • Insignificant vertical growth
Mpunguzi (Iringa Road)	• Density increased to 21houses/hectare	• Residential land use dominates • Urban farms in peripheries	Tree-like pattern taping to cul-de-sac in the peripheries	• detached houses dominate • single storey houses dominate	• Sprawling urban form in peripheries • Insignificant vertical growth

Table 5: Cross-case analysis from 1976 to 2021
Source: Observations and measurement, June 2021

Hord (1905) argues that, price of land decreases from the center at a rate to produce income effect to balance the increased transport costs, where high income opts to live in periphery where they can occupy larger plots this converges with the findings in the study area where price decreases from the Centre and main road and plot density increases from the main road and CBD. The theory of urban land market isn't applicable in the context of Dodoma National Capital City where low-income earners are found in informal settlements in the peripheries contrary to what argued by Hord. Alonso's preposition of concentric zone in the Bid-rent theory did not account for influence of infrastructure development and land market to the emerging city form of Dodoma national capital city. Lynch (1960) also argues that, the density with which spaces or channels packed into a given unit area can be stated as a single quantity if uniform, but more like as ranges of intensity and average and typical intensities this has been realized by the study findings where, residential densities are observed to concentrates along main transportation route, CBD and public services and classified as densely areas while those far from CBD and transportation route classified as less density areas The revealed mixture of both consolidated and sprawling city forms in the study area does not reveal what has been discussed by some scholars as a polycentric and or decentralized concentrated city form subscribing sustainable city form.

4.2 Planning and policy issues on the emerging city form of Dodoma

One of the major planning issues that confronts the achievement of sustainable urban form in Dodoma is the informal plot subdivision in which land owners have subdivided their parcels outside the conventional ways for planning and selling purposes. Plots sizes, alignment and plot ratio are the key factor of optimal utilization of lands. Land owners have developed more than one house in a single residential plot especially along the main transport networks for residential and commercial purposes. This is similar to what was argued by Denis (1989) in Canada, where developers had the opinion to vary densities to use more or less t the same site to build a larger or a smaller building or

to increase or decrease the street frontage. Section 31(1), 9(7) of Urban Planning Act of 2007 and sections 6(1) and (2) of the Urban Planning Regulations restrict informal subdivision and densification of land. However, these guidelines are effective in planned and surveyed areas. Lack of legal provision for informal settlements is contributing towards consolidated and sprawling urban form. Lack of regulatory framework for land buying and selling in unplanned settlement is also a contributory factor for an increased densities, distortion of urban layout and uneven development resulting into patches of densely developed areas especially on prime lands and sprawling or scattered development on areas that are far from main roads and public services. Section 4.2.18(iv) of the National Land Policy (1995) requires all land transaction to be registered by Registrar for Lands before they take legal effect and sections 6(1) and (2) of Urban Planning Regulations (2018) and Section 35(1) of the Land Act (1999) which regulate change of use in planned, surveyed and titled areas are weakly exercised in informal settlements and have contributed the sprawling and consolidating city form.

Spatial planning interventions are also observed as contributory factors for the emerging city form of Dodoma National Capital City. The 1976 Dodoma Master Plan which designated Broad Acre areas as greenbelt mainly to be used for farming activities, the 2010-2030 Master Plan changed uses from urban farming by designating Broad Acre as area for redevelopment. The 2018 regularization projects further compromised planning standards and stinted the triumph of anticipated city form by the 2010-2030 master plan. The 2019-2039 Dodoma National Capital City Master Plan designated these areas along main roads as commercial urban strips subject to implementation of schemes of redevelopment. However, this has remained a question on the capacity of the City Council to implement the proposed developments.

The study findings showed that dynamics in spatial planning interventions, limited capacity of planning authority to enforce and implement plans as well as lack of spatial plans implementation framework to a larger extent has contributed to the development of consolidated and sprawling urban form in Dodoma National Capital City. Section 6.8.1 (i-iii) of the National Land Policy (1995) emphasizes Planning authorities to engage local community, private and public agencies in mobilization of resource required for plan implementation. However, the policy doesn't show a framework on how actors in plan implementation have to act. Further, actors are not specified and their roles not stated. This has therefore remained a statement that doesn't have legal mandate. Recently participatory planning has been adopted by Dodoma city council whereby land owners contribute 30-40 percent of their gross land as substitute of costs for planning, surveying and spaces for basic infrastructures and public services.

This approach has little shown a positive input towards realization of the anticipated city form; however, it has raised an alarming conflict between land owners and the City council associated with dissatisfaction by land owners with regard to extent of participation and level of involvement especially in planning and allocation processes, the remedy of which has been to compromise the standards by subdividing the already surveyed public spaces such as market, public building and dispensary and re-allocate the new plots to land owners in order to settle the disputes.

5. CONCLUSIONS

This paper has empirically demonstrated that the emerging city form of Dodoma depicts a mixture of both sprawling and compact urban form, which is differentiated by higher densities along main transport routes and public facilities. A consolidated urban form along major roads is characterized by high densities, mixed uses, significant proportion of semi-detached, row houses and block of flats and single storey houses. In settlements where development control was effectively enforced grid-rectilinear layout of settlements has been observed. In settlements where development control was less effective a tree-like layout of transport networks has been observed.

The latter is also characterized by dominance of detached and single storey building types and insignificant proportion of semi-detached, row-house, block of flats, medium and high-rise building types. The paper has revealed that, among the factors that have contributed to the observed city form of Dodoma (sprawl and compact), informal land buying and selling, informal plot subdivision, informal change of land uses, unregulated land price as well as incapability of the City Council to enforce development plans are the key factors.

The case study settlements provided evidence on the need for re-orientation and revisiting of National Human Settlements Development Policy (2000), the National Land Policy (1995), the Land Act (1999) and the Urban Planning Regulations of 2018 to manage densification, change of use, plot subdivision, land selling and buying as well as price increase in the informal settlements. This paper further recommends that there is a need to agglomerate the scattered settlement centres through infill development accompanied with provision of services and infrastructure. Guidelines should advocate for compact development through schemes of redevelopment in area along the main roads. As contribution to knowledge, this paper has shown that market forces, planning policies and planning intervention collectively play a role in city form formation. Therefore, any attempt to re-configure a sustainable city form, these parameters should be seriously taken into consideration especially in rapidly urbanizing city context.

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8. AUTHOR CONTRIBUTIONS:

[1]**Azor William Nyakamwe;** As the main Author, I contributed as the writer of this study

[2]**John Modestus Lupala;** As the main student supervisor, I provided consultation throughout developing the study

[3]**Emmanuel Elifadhili Mchome;** As an assistant supervisor, I provided student with series of consultation in writing tis paper

9. ADDITIONAL READING

1. Sustainable Urban Form and Real Estate Markets, pp1-pp20 Paper Presented to the 11th European Real Estate Society Conference, Springer, Milan, Italy (Jones, C.A. and Mac Donald C 2004)
2. Understanding Land Markets in African Urban Areas: The Case of Dar es Salaam Tanzania. *Habitat International*, Elsevier, 24 (2) 151-165 (Kironde, 2000).
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11. KEY TERMS AND DEFINITIONS

Land: any part of specified area on the ground defined by its boundaries and affected to a qualified activity.

Land market; a framework that constitutes a variety of institutions, individuals, rules and regulations through which land searchers and land sellers are brought into transactions in order to get access to land by the land seekers

Urban form; a city's physical characteristics. At the broad city or regional scale, urban form means spatial configuration of fixed elements**.**