ASSESSING THE IMPACT OF ROAD EXPANSION IN PERI-URBAN AREAS. THE CASE OF KASOA, ACCRA CITY

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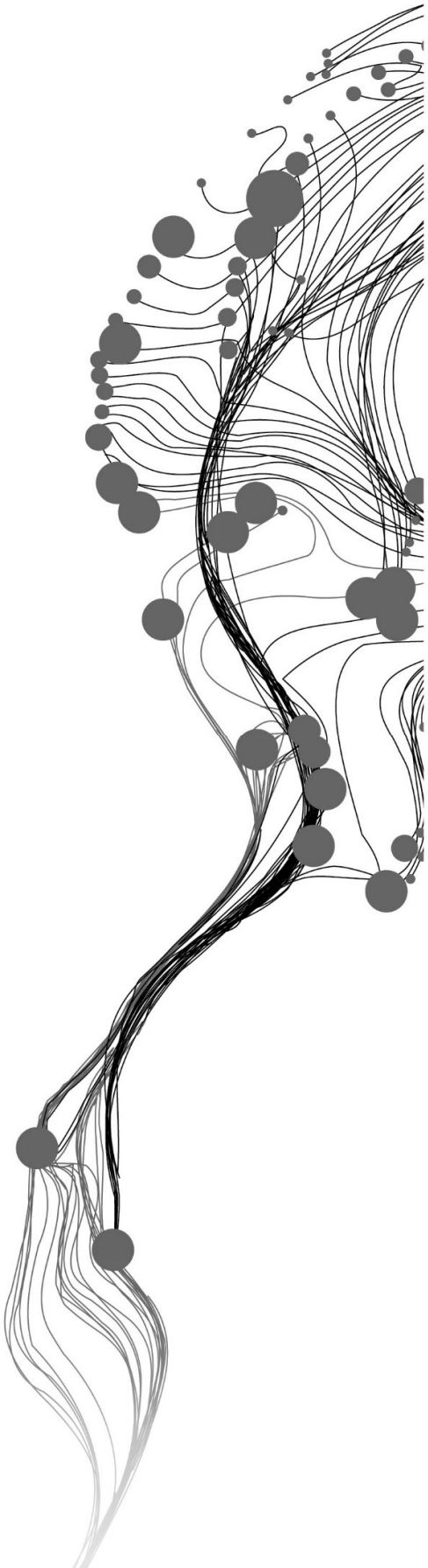

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ABSTRACT

Rapid urbanization in the Global South leads to an upsurge in mega physical infrastructural developments including road expansion and construction projects. This takes place across urban and peri-urban zones. In recent times, this has changed the spatial character and socio-economic dynamics within urban and peri-urban areas. These mega road infrastructure developments have both positive and negative consequences in peri-urban areas, namely: changes in land uses, social fibre, living conditions and investment opportunities. However, it is unclear how such developments actually shape and influence the patterns of residential development dynamics as well as social relations in peri-urban areas. This study sought to investigate this phenomenon at the level of Kasoa township, Accra city, Ghana with specific reference to road expansion. To do so, this present study used a mixed methodological approach (qualitative and quantitative). To understand the lived experiences of affected people, in-depth interviews of key informants, focus group discussions and questionnaire survey were conducted. While the primary data provided an understanding of the prevailing patterns of residential development and socio-economic dynamics resulting from road expansion, the secondary data was used to classify the case area into different residential areas namely, richer and poorer areas. Spatial methods were subsequently used to visualize and interpret the situation before and after the expansion of the road. This study found out that the road expansion led to the emergence of some residential developments patterns such as gating in the two communities. Secondly, the road expansion led to gentrification as it partly served as a conduit for the influxes of middle and high-income residents which caused displacement of some poor people in the communities owning to harsh living conditions, though more social services were made available in them. Thirdly, the road expansion resulted into the decline of integration in both communities, as asking for help, knowing one another and social interactions with other neighbourhoods were perceive to have decreased in the communities. Finally, the road expansion led to both positive and negative residential development dynamics in the case area, which have the potential of affecting living conditions and socio-spatial spheres of its communities and other surrounding communities.

Keywords: Road expansion, impact, residential development, spatial dynamics, socio-economic dynamics, integration, community integration, symbolic integration, functional integration, peri-urban areas.

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BHC	Bank for Housing and Construction
CBD	Central Business District
CoV	Coefficient of Variation
FGDs	Focus Group Discussions
GNHC	Ghana National Housing Corporation
GSS	Ghana Statistical Services
GIS	Geographic Information Systems
KIs	Key informants
LCHC	Low Cost Housing Committee
L I	Legislative Instrument
SPSS	Software Package for Social Science
TCPD	Town and Country Planning Department
MMDAs	Metropolitan Municipal and District Assemblies
SAP	Structural Adjustment Programme

1. INTRODUCTION

In the 21st century, urbanization has been escalating at an alarming rate in the cities of the Global South, increasing their growth as well as their physical development. The rapid urbanization increase in the Global South has resulted in a spatial pattern of planned, unplanned and slum residential fragments (Balbo, 1993). For instance, urbanization in Africa is estimated to reach about 58% in 2050, with urban centres on the continent hosting nearly a quarter of the global urban population (Cobbinah, Erdiaw-Kwasie, & Amoateng ,2015; UNDESA, 2012). Such rate of urbanization and its related consequences like informal settlements in the Global South have long and short term impacts on sustainability of the built and natural environments (Cobbinah et al., 2015; UNDESA, 2012). However, such impacts are not limited to urban areas but peri-urban areas as well. Given the current rate of urbanization in the Global South, peri-urban towns have now become the next destinations for residential and economic developments (Ravetz, Fertner, and Nielsen, 2013; Simon, McGregor, and Nsiah-Gyabaah, 2004), owing to availability of land at low cost and their nearness to job places in cities (Thuo, 2010). The effect of the rapid urbanization on peri-urban communities has led to the construction of more roads expansion in such areas (Amoateng, Cobbinah, & Owusu-Adade, 2013).

1.1. Background and Justification

Globally, financial aid by World Bank to countries in the Global South, including those of Africa, is expected to double in the future, and a large part of it is expected to be channelled into infrastructural development (Gachassin, Najman, & Raballand, 2010). In 2009, the World Bank committed $7 billion (US Dollars) in Sub-Saharan Africa, and about $ 1.5 billion of that went into development of roads (Gachassin et al., 2010). Studies found that amongst all physical infrastructural developments, roads remain the infrastructure capable of reducing poverty in the world, especially in the Global South countries (Gachassin et al., 2010). A research in Bangladesh in 2009 (Wiegand, Koomen, Pradhan, & Edmonds, 2017) found that villages in an improved road corridor experienced 5% poverty reduction, suggesting road construction as a pro-poor strategy. It is also emphasized that poverty rate is high in the Global South countries with limited road networks (Lebo & Schelling, 2001). Research on transportation investment in developing countries identified road infrastructure as a major catalyst in the promotion of economic growth (Asomani-Boateng, Fricano, & Adarkwa, 2015; Knowles 2006). Road development over the last decade had significant impact on socio-economic conditions of residents in cities (Knowles, 2006).

However, road expansion also has negative consequences on areas where it takes place. In the first place, Khumya and Kusakabe (2015) confirmed that road development has tremendous impact on living conditions in peri-urban residential areas like employment and investment opportunities. It can also be a threat of causing disintegration within such areas. Construction of roads can result into the influx of wealthy class, widening the welfare gap in localities (Budiyati, Wahyu, & Gleave, 2014). For instance, in the case of Desa Nanga Tumpu in Indonesia, some poor residents were displaced by the wealthy people during road construction (Budiyati et al., 2014). Thus road construction can lead to spatial and socio-economic problems in communities, especially for the poor. This is similar to the observation made by Mabogunje (1990) and Kombe (2005) that highways construction in Tanzania crossing peri-urban towns led to a large acquisition of tracts of land by the rich at the expense of the poor. This resulted into societal disintegration, where the poor were displaced into the hinterlands with the rich aggregately seen developing linearly close to major roads for various advantages including commercial purposes. Also Grant (2009) described that peri-urban

development in West Africa is a process of both upscale residential developments and low income self-built housing development , without enough studies on the development patterns in peri-urban towns.
Recent studies revealed that peri-urban expansion in the Global South has not been evaluated (Doan & Oduro, 2012). In the context of Ghana, despite that throughout the 1970 to 2000 period, peri-urban communities close to road highways were increasingly more densely populated than those farther away from road highways, however, no study has been conducted to find out why this phenomenon is present (Doan & Oduro, 2012).

1.2. Research Problem

The emergence of mega urban development infrastructures beyond administrative boundaries of cities is widespread especially among cities in the Global South, which has a catalytic effect on spatial and socio-economic changes (Hudalah, Winarso, & Woltjer, 2007). Cities in Ghana continually experience rapid urban development due to population growth and migration, opening up the frontiers of peri-urban areas which serve as interactive zones for urban and rural forces. This leads to competition between newcomers and old inhabitants for land and other natural resources (Yankson & Gough, 1999).
Physical urban development has also resulted into social and spatial heterogeneities especially within the peri-urban area which comprises interaction between indigenous residents, informal settlers, industrial entrepreneurs and a diversity of individuals, and changes in land use. This interaction among these actors results into competing interests, practices and emerging perceptions. Essentially, this complicates the morphologies of peri-urban communities in Ghana (Cobbinah, Gaisie, & Owusu-Amponsah, 2015). Consequently, various attempts have been made to understand the impact of physical urban development outside the boundaries of cities in Ghana (Yankson & Gough, 1999). Cobbinah et al., (2015) observed that physical development in peri-urban areas of Ghana resulted into both positive and negative changes in living conditions of indigenous residents. The study of Van De Walle and Cratty (2002) noted that, roads are key to raising living standards in poor rural areas.
Furthermore, in the case of Accra like many other cities, especially in the Global South, there is rapid development of the peri-urban areas within and around the urban core of Accra. Often, the construction of road highways through peri-urban areas sets the locus for direction of peri-urban development (Kasanga, Cochrane, King, & Roth, 1996). However, the physical transformation of peri-urban communities comes with social implications such as, the marginalization of locals through loss of livelihood as agriculture lands owned by these local residents are used for such developments (Simon et al., 2004). Despite some attempts to understand the consequences of major urban developments like road expansion projects in Ghana, little attention is given to that of peri-urban areas. Doan and Oduro (2012) in their study of physical space and management of peri-urban towns highlighted the need for further studies on spatial and socio-economic ramifications of road infrastructural expansions on peri-urban communities in Ghana.
Specifically, Kasoa which serves as an administrative capital of Awutu Senya East District lies at the border of Greater Accra and Central regions and is fast transforming in different ways in recent times. The town has recorded a high influx movement of high and middle-income residents owing to the new opportunities presented by a road highway. As a result, the living conditions of residents has affected especially the very poor who are farther displaced (ASIRT, 2014). It is evident in that better roads in peri-urban settlements are perceived as a recipe for the displacement of the poor farther away from such roads by high and middle-income residents (Kombe, 2005). By virtue of these developments, the town is experiencing spatial and socio-economic changes since the inception of the road highway project.
Hence, the purpose of this study is to understand the residential development dynamics due to road expansion within Kasoa, a peri-urban town, which affects living conditions within the area. This study seeks not only to fill in the body of literature on the impact of road expansion in peri-urban areas in Ghana, which is missing, but serves as a source of information for town planners and government agencies in the

formulation of policies to deal with impacts of mega development projects in communities for societal integration in Ghana and beyond.

1.3. Research objectives

1.3.1 General objective

The main objective of the research is to understand residential development dynamics due to road expansion in peri-urban areas in Accra city.

1.3.2 Specific objectives

In order to achieve the main research objective, the following specific objectives and questions were raised:

1. To understand the prevailing patterns of residential development in peri-urban communities.
    - How has local planning and policy shaped and influenced residential development?
    - How has road expansion shaped and influenced residential development?
    - What are the prevailing types of residential development due to road expansion in peri-urban communities?
2. To identify the spatial and socio-economic dynamics in peri-urban communities due to road expansion.
    - What are the spatial and socio-economic dynamics in peri-urban communities due to road expansion over time?
    - What are the variations in the spatial and socio-economic dynamics across peri-urban communities due to road expansion?
3. To assess perceived impact of road expansion on residents in different types of residential development in peri-urban communities.
    - What are the perceptions of residents with regard to the impact of road expansion?
    - To what extent does road expansion as perceived affect the living conditions of residents in peri-urban communities?
    - What is the level of effect on social integration in peri-urban communities due to road expansion?

1.4 Thesis structure

This study consists of six chapters. Chapter 1 presents the introduction, background and justification, research problem, objectives and questions. Chapter 2 focuses on literature review with particular emphasis on key concepts of the study from existing studies on road infrastructure, peri-urbanization and integration; it presents the conceptual framework. Chapter 3 highlights the study area, methods and techniques for data collection and processing, research design and strategy, sampling techniques and ethical considerations. Chapters 4 presents the results of this study based on the set objectives and questions. Chapter 5 presents the discussion aspect for explanation and interpretation of the findings of this study in line with its literature review. Finally, chapter 6 presents the conclusion and recommendations for future research.

2 LITERATURE REVIEW

This section of this study briefly explains key concepts and related terms with regards to the impact of road expansion in peri-urban towns based on existing literature.

2.1 Road infrastructure development in Global South cities

Roads are the predominant thoroughfares in the Global South cities and symbolize critical components for economic development. This high depedenpency on roads as a transport infrastructure has resulted into massive investment in the road sector, at the donor and country levels in the Global South (Asomani-Boateng et al., 2015). For example, in Sub-Sahara Africa, road transport is by far the most common transport infrastructure for conveying over 75% of freight and passengers. However, 50% of roads in the Sub-Sahara region are not in motorable conditions, owing to poor road management system or underfinancing in the road sector (Beuran, Gachassin, & Raballand, 2015).

2.2 Dimensions of road expansions in cities

2.2.1 Socio-economic dimension of road expansion

Roads as transportation infrastructures serve not only to improve mobility in society but also to enhance the socio-economic needs of society by providing access to various social services such as hospitals, schools and job places (Pradhan & Bagchi, 2013). Roads also impact on living conditions in society through creating access to market centres for households to be engaged in the labour markets, ease transport cost for agricultural goods and inputs and attract financial services such as micro-finance firms, savings and loans companies which facilitates investments in agriculture, especially in the urban peripheral and rural communities (Gibson & Rozelle, 2003). It is critical to note that the creation of better markets access by roads does not only raise local productivity and wages but facilitates transformation of subsistence agriculture to cash crop agricultural ventures, as well as diversification of household income sources in society (Aggarwal, 2018; Mu & Van De Walle, 2011). All these can lead to improve [in] the living conditions of residents closer to roads.

However, just as the upgrading of roads accelerates social development and enhance welfare of communities, especially those located near the improved roads, it also has the threats of leading to negative socio-economic changes in communities (Wiegand et al., 2017). During roads construction, the spontaneous migration of population has the tendency of causing psychological and emotional trauma. This negatively affects the productivity levels of affected persons; which eventually widens the income gap and affects their living conditions (Porter, 1995). Some scholars, therefore, asserted the view that road development can lead to increasing income disparity in society for the fact that its benefits accruing to the poor is much limited. Road expansion tends to benefit the rich more, who grab and own land due to increase in land values caused by road improvement (Porter, 2011; Leinbach, 2000). According to the literature, small local enterprises in city zones are under constant threat when better roads are constructed, due to the infiltration of large entrepreneurs which can out compete local existing ones (Kusakabe, Sereyvath, Suntornratana, & Sriputinibondh, 2008). Rapid road development in communities has the tendency of sparking social conflicts between the rich and poor (Rammelt & Leung, 2017). This is because road expansion guarantees the influx of the rich who eventually dwell in new settlement areas with high quality in the midst of the already poor dwellers and this tends to create some upheavals in society as the poor perceive the rich of grabbing their land to enrich their fortunes (Becker, 2013).

2.2.2 Spatial dimensions of road expansion

It is known that as roads are expanded, they lead to a number of spatial dynamics in cities. Road expansion in peri-urban areas leads to an increase in land consumption mostly for residential buildings and other complementary uses. This results from the influx of economic powerful population into communities due to easy access to jobs and other opportunities being created (Woltjer, 2014), and increasing density of physical development. In Eastern Asia for example, 40% to 70% of the urban population reside in peri-urban areas, thereby consuming large portions of land (Woltjer, 2014). This results in decrease in agricultural land uses while residential land uses are upscaling.

In addition to that, land uses in cities tend to change when there is a major road expansion through them. Residential land uses tend to give way to commercial uses as in the study of Briggs and Mwamfupe (2000) and such commercial uses mostly develop along major roads (Oosterbaan, Arku, & Asiedu, 2012). This is the case because road expansion in peri-urban towns renders them as no longer as survival zones but as investment zones for entrepreneurs and other economic and service activities (Briggs & Mwamfupe, 2000). Furthermore, residential morphologies of areas transformed when there is a road development project as it can result into residential differentiation. Road expansion in communities can result into marked differences of residential properties as shown in the research by Aseidu and Arku (2009) that rich class apartments appear linear along the road with poor class dwelling units farther hinterlands, resulting in gating by the rich class to protect themselves from attacks from the poor. In Tanzania, road improvements in some communities had marked influence on their physical urban form, showing distinctively rich residential buildings from that of the poor (Briggs & Mwamfupe, 2000) that is due to the poor being displaced by the rich. Similarly, residential segregation becomes obvious as road improvements in communities, especially in peri-urban ones attract real property developers to acquire available land to develop estates that are quite distinguished from the local prevailing styles of dwellings (Aseidu & Arku, 2009). This tends to create a certain spatial fragmentation of the "haves" and "have nots" in such communities.

2.3 Peri-urban areas

There is no single definition of "peri-urban" across the globe and for any single city, as such definition of peri-urban is usually specific to some variables of interest (Mbiba & Huchzermeyer, 2002). The term peri-urban area refers to the zone between urban and rural areas, without clear boundaries, both in geographical and conceptual terms (Goncalves, Go, Ezequiel, Moreira, & Loupa-ramos, 2017). Peri-urban areas are zones close to large cities with less than 30km in distance, or in a large buffer zone around large cities within 30-100km or close to medium-sized cities less than 30km or close to small cities less than 10km (Gonclaves et al., 2017). Geographically, peri-urban areas consists of landscapes of mixed land uses and livelihoods, with the characteristics of both the urban and rural spaces (Díaz-Caravantes & Sánchez-Flores, 2011). Traditionally, peri-urban have been approached from urban planning context as a terrain for urban sprawl, serving as locations for both regional and trans-regional infrastructure (Huang, Wang, & Budd, 2009) and a suitable location for specific tertiary sector structures like outlets, logistics, offices, parks and alike.

It is, however, important to know that peri-urban areas cannot be understood completely in the context of spatial terms but rather broadly as a link of networks connecting urban agents and rural producers (Hernández-Guerrero, Vieyra-Medrano, & Mendoza, 2012). That is why any integrated analysis of peri-urban areas should be addressed in multi-dimensional ways not only involving land use patterns but other aspects such as identity and lifestyles, households, economic activities and mobility patterns of their inhabitants (Gonclaves et al., 2017). This implies that issues of peri-urban areas are not limited to only its spatial attributes but other non-spatial variables. It is therefore critical to underscore that "the peri-urban character" is a mixture of multi-faceted aspects inter alia diversification of economy, settlement patterns, accessibility infrastructure, conservation and territorial impact of structural changes in land use, cultural

heritage as well as co-operation between urban and rural authorities at the local administrative level (Hornis, Ritsema, & Eck, 2008).

2.3.1 Characteristics of peri-urban areas

The characteristics of peri-urban areas range from structural to non-structural in nature. In the context of structural characteristics, these include lower population and housing densities as compared to urban areas, heterogeneous land uses and rapid rate of change (Winarso, Hudalah, & Firman, 2015). That is in peri-urban areas, there exist mixed-use-developments featuring hotels, recreation space, shopping mall, offices, cultural centres and convenience retails. Also in the frame of non-structural characteristics, this has to do with new forms of household compositions, differential in access to urban benefits such as health infrastructure, employment opportunities and public transport and increasing pressure on common natural resources (Winarso et al., 2015). Residential settlement in peri-urban areas is influenced by transport infrastructure as they have an effect on accessibility to jobs, services and land values (Ravetz et al., 2013). In other parts of the world, peri-urban areas are characterized by affluence and conspicuous consumption while in others it is where poverty and social inequality are more visible (Winarso et al., 2015).
According to Ravetz et al. (2013), peri-urban areas basically can be grouped into two segments as explained below:

- Urban fringe: This refers to a zone along the edges of built up areas, which consists of scattered patterns of lower settlement density, urban concentrations around transport, together with conspicuous green open spaces, such as golf courses, nature reserves and farmlands.
- Urban periphery: This segment of the peri-urban area refers to a zone surrounding the main built up areas, with lower population density, but belonging to the functional urban area, such as smaller settlements, industrial areas and urban land uses within a matrix of functional agriculture.

2.3.2 Land uses in peri-urban areas and its driving forces in the Global South

Peri-urban areas are usually locations of productive agricultural and other rural activities and with significant environmental values. The predominant land use in peri-urban areas is agriculture and this helps to provide food security for not only for urban settlers but also for rural folks (Buxton, 2014). However, peri-urban areas in recent years are faced with constant and rapid changes from the forces of urban centres and this has now increased the number of land uses in them as well. They are regarded as the fastest growing zones in countries in the Global South and hold high strategic, spatial, economic, social and environmental importance (Buxton, 2014). Generally land uses in peri-urban areas include industrial activities, residential and commercial activities but with the main activity being agricultural activities.
Peri-urban areas emerged when urban residents purchase prime lands for agricultural purposes, outside the urban city for commercial or residential purposes (Samat, Hasni, & Elhadary, 2011; Mandere, Ness, & Anderberg, 2010). The differences for peri-urban areas for commercial and residential purposes is driven by the issue that peri-urban areas have affordable rents in comparison with the city (Acheampong & Anokye, 2013). Peri-urban lands are used for multiple activities within the prevailing socio-economic peculiarities. Peri-urbanization as a concept contains clusters of residential, commercial, rural-residential and diverse agricultural uses (Mandere et al., 2010). In Ghana, the outward expansion in cities into peri-urban areas eventually causes land uses to change in peri-urban areas (Appiah, Bugri, Forkuor, & Boateng, 2014). According to Acheampong and Anokye (2013) the major driving forces for conversion and transformation of land uses in Ghana include: demand for housing by the teeming population, deterioration of housing conditions, and inadequate urban services. Higher economic gain associated with the conversion and transformation of peri-urban agricultural lands to commercial and residential uses is also a driving force for rapid changes in land uses in peri-urban areas. Thus with economic rationality, land owners would opt for users with higher yield returns from their lands in the future against agriculture (Irwin & Geoghegan, 2001) this leads to the problem of food insecurity in such areas.

2.3.3 Peri-urbanization and road network

Many scholars have emphasized that peri-urban development tend to follow major road highways connecting the core city to other urban areas and rural communities (Doan & Oduro, 2012). The presence of roads serves as a source of encouragement for residents to set up small-scale 'roadside' business activities as a way to target travellers, especially at major intersections (Doan & Oduro, 2012). This is more applicable in peri-urban areas in Accra, where livelihoods of countless residents are dependent on proximity to roads. Proximity to road highways is critical for many residents in peri-urban Accra, whether they own a car or use public transport, since most of them make frequent trips to Accra for their daily jobs, buy essential commodities and for activities not available in the urban periphery (Doan & Oduro, 2012). In addition, some peri-urban residents undertake vending and other petty trading activities either directly on the road or at the roadside.

Roads development which are regarded as symbols for development are expected to improve labour markets, economic opportunities and production specialization (Knowles, 2006). However, there usually exists limited connectivity between different parts within peri-urban zones in the Global South cities, making road highways the most crucial routes for vehicular travels and locations for business. This limited connectivity within peri-urban zones is attributable to the untarred nature of both secondary arterials and local access roads (Doan & Oduro, 2012).

2.3.4 Peri-urbanization and Residential development

The emergence of peri-urbanization is dominated by residential development and, to a certain degree by commercial and manufacturing developments (Amoateng et al., 2013; Cobbinah & Amoako, 2012; Doan & Oduro, 2012). It is observed that the emergence of peri-urbanization leads to the rise of non-agricultural livelihood options for locales (Tuyen, Lim, & Huong, 2014), due to mass residential development resulting in poor quality of life conditions of households as prices of foodstuff increase in such areas. The rising costs of foodstuff in peri-urban residential areas may force indigenous residents to migrate to other places farther away from original dwellings and making their living conditions difficult and uncertain (Cobbinah et al., 2015). And considering the diverse nature of land ownership in Ghana, residential apartments of residents of peri-urban communities are at risk to the pressures of rapid urban growth and physical development as a chunk of lands are in the control of traditional authorities which continually re-allocate land for physical developments (Cobbinah et al., 2015).

2.4 Integration

The term integration in cities is where there are no barriers which allows the poor class to become part of urban environments to enjoy and improve their well-being (Sabatini & Salcedo, 2007). This is normally envisaged in cities by the walling of the elite residential buildings surrounded by low-income population in some parts of the urban peripheral (Sabatini & Salcedo, 2007). Integration as a concept is into three distinct dimensions as briefly discussed here below:

Functional integration: This integration dimension denotes where residents, especially the poor ones, have access and utilize public services and facilities (Sabatini & Salcedo, 2007). Therefore, this integration can be measured by the level of participation in activities. In political wise, it has to be with the rights and privileges which are enjoyed by a person.

Symbolic integration: This signifies the degree of sense of belonging that a person has towards his or her community or neighbourhood and it may even manifests in the midst of unequal relations (Ruiz-Tagle, 2013; Sabatini & Salcedo, 2007). In many literature, symbolic dimension of integration is sometimes confused with community integration while the latter requires certain degree of sameness and level of equality (Babatunde, 2015).

Community integration: This refers to an integration where a person forms strong social ties beyond simple functional exchange but is also based on creation of friendship and networks (Sabatini & Salcedo, 2007).

This integration invariably captures friendship, family relations and solidarity network in which people are recognised as equal and with much more involvement and intimacy.
Despite the differences in the definitions of the dimensions of integration, their combined outcome denotes the level of relationship amongst members of a society at a given time to inform policy makers about ways of strengthening social integration.

2.5 Road development and living conditions

It is noted that road development has the potential of affecting the living conditions of residents in affected areas in both positive and negative ways. In the wake of mega development projects like construction of road highways, there is a change in living conditions of residents of affected areas through income satisfaction and employment opportunities (Xu & Xie, 2014). With road development, cities tend to experience a heterogeneous mix of original residents, newly migrating population and urban population from nearby communities and districts (Won, Cho, & Kim, 2015). Parcel-level redevelopment and renovation activities transpire in cities, comes with occupational changes of residents and with emerging commercial ventures in response to the catalytic effect of road infrastructure (Won et al., 2015). This tends to improve living conditions of residents to a certain degree through employment creation. This is because road development also attracts risk-taking entrepreneurs, who might play a major role in the redevelopment of space in such cities (Won et al., 2015).
Road development which aims to improve connectivity between areas either in urban or rural settings comes with certain benefits to residents. Better roads have the potential to impact living standards through a number of ways: enable rural households to engage with the labour market, reduce transport costs for agricultural goods and inputs and permit frequent transport options for people (Wiegand et al., 2017). It is also observed by some research analysts that, living close to roads with higher traffic intensity creates better markets for local businesses like roadside stalls. Road development may raise local productivity and wages, and facilitate transformation from subsistence agriculture to non-agricultural activities, enabling diversification of household income sources (Aggarwal, 2018; Mu & Van De Walle, 2011). Better roads also enhance access to basic services like schools and health facilities, lower their cost and improve their quality, since these facilities are easier to be reached (Wiegand et al., 2017). Road-building in development agenda also has the potential of reducing poverty in areas as evidenced in the 1970s, 1980s and 1990s road development projects funded by the World Bank, especially in the Global South (Farias, 2016). It is established that the direct consequences of the completion of road highways in communities are branded in the increase in prices of commodities such as food, fuel and rent (Farias, 2016).

2.6 Road infrastructure development in Ghana

Before the 1920s, railway was the main mode of transportation in Ghana by the colonial authorities as a mechanism to transport resources from the hinterlands to the coastal zones for onward shipment to Europe and beyond (Jedwab & Moradi, 2011). Roads were the first complementary transport mode to the railway system in the 1920s serving as feeders to the railway. Back as at 1924, roads in the Gold coast (now Ghana) were of poor quality. Road improvement came to the fore when the government of the then Gold coast initiated the *Tarmet Program* where it began to develop roads of suitable quality for motor traffic through the year. Roads were mainly developed in the cocoa growing areas to open up new areas in the commodity production for the transport of the cocoa to the coastal areas for export (Jedwab & Moradi, 2011). Roads were primarily constructed in cocoa producing areas to boost its production. As at the year 2000, Ghana's road network has increased by about 35,059 kilometres as a way to improve accessibility to rural areas in the country (Adams, 2016). In 2015, Ghana's total road network was about 72,380.65 kilometres, with 21% each of that being urban and truck roads respectively and 58% being feeder roads (Adams, 2016). This implies an increase in overall development of roads in Ghana from the early days in the 1920s to current.

2.7 Conceptual framework

The conceptual framework (Figure2-1) explains the relationship among the main different concepts underlying residential development dynamics due to road expansion in peri-urban communities. The concepts include road expansion, spatial and socio-economic dynamics, and impact of road expansion on residents in different types of redevelopment in peri-urban communities. There is a relationship between road expansion and spatial and socio-economic dynamics in peri-urban communities (Cobbinah et al., 2015). As emphasized by Fajar (2014) road construction has the threat of leading to spatial and socio-economic division between the rich and poor.

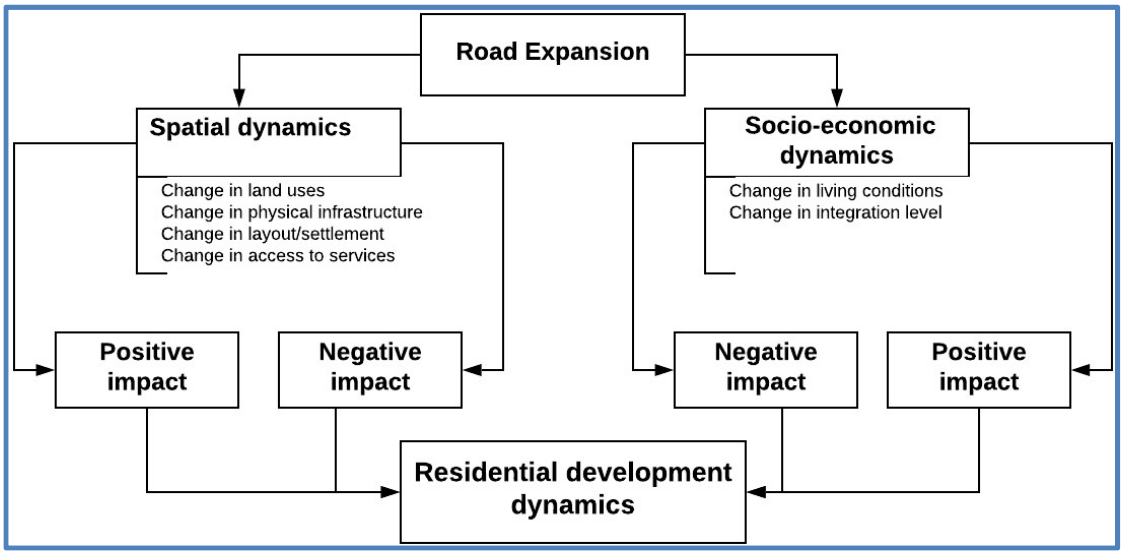

Figure 2- 1: Conceptual framework of residential development dynamics due to road expansion in peri-urban communities

3 STUDY AREA, METHODS AND DATA

This chapter highlights the background of Accra city and explain the research design and methods to accomplish the objectives of this research.

3.1 Historical development and growth of Accra city

Like any other city within the Africa Sub-Sahara, Accra is urbanizing rapidly, making it one of the fastest-growing cities within the West Africa sub-region. Accra, which is the capital city of Ghana, has the highest population in the country (Grant & Yankson, 2003; United Nations Development Programme, 1999). According to the 2010 Housing and Population census, Accra has a population growth of 3.1% per annum (Ghana Statistical Service, 2012). To the south, the city of Accra is bounded by the Gulf of Guinea of the Atlantic Ocean. One visible expression of the city coupled with its growth is its spatial expansion in recent times. It is regarded as the most diversified and cosmopolitan city in Ghana, as it has different nationals within the West Africa region and beyond (Grant & Yankson, 2003). As a city, Accra is recently seeing many physical infrastructural developments including that of road expansion in its urban core and peri-urban areas. Figure 3-1 shows the location of the study area in Ghana.

The growth of urban Accra is expected to extend in a few decades, as evidenced by the fact that peri-urban towns like Kasoa, Dodowa and Aburi have become functionally connected to Accra central serving as dormitory towns (Doan & Oduro, 2012). Considering the rapid physical changes emerging, the peri-urban zone of Accra includes areas situated between 10km to 40km from the centre of Accra including that of Kasoa in the Effutu-Awutu-Senya District (Yankson & Gough, 1999). Until a decade ago, peri-urban Accra consisted of dispersed rural settlements where subsistence agriculture was widely practiced. Today such settlements are surrounded by new housing at various stages of construction and little farmland remains. In peri-urban Kasoa, richer households are moving into newly completed houses and the poorer households are seeking rooms within the indigenous settlements to rent (Yankson & Gough, 1999). Therefore, spatially, Kasoa, although appearing densely built, is still a peri-urban zone in Accra.

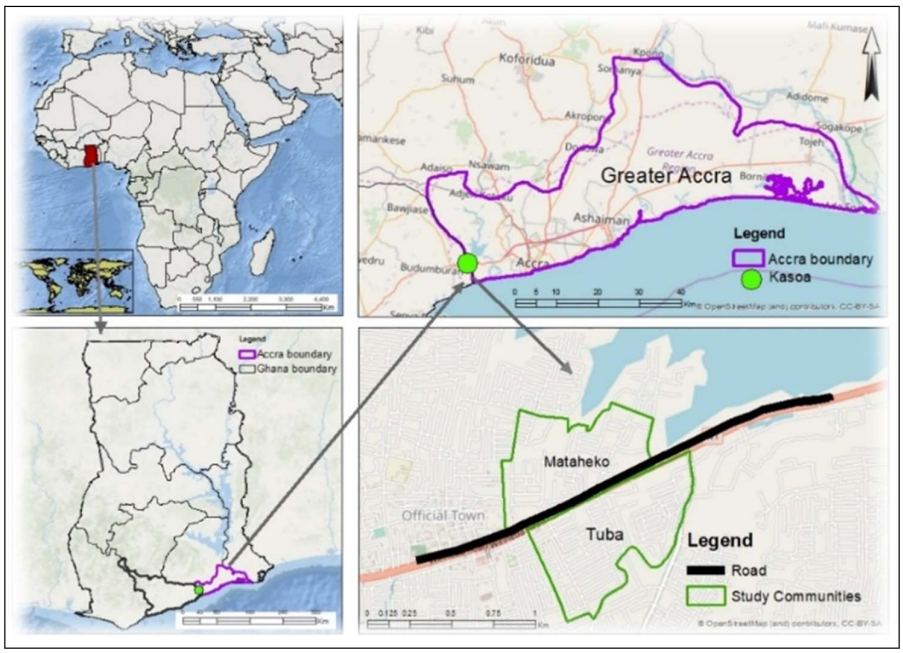

Figure 3- 1: Study area location, Kasoa, Accra city, Ghana (*Source: Google Earth and DIVA-GIS*)

Colonial era

The main urban settlements in Accra were situated inland where they operated as points for the trans-sahara trade routes and as political centres for tribal empires. The rise of Accra as an urban centre dates back to 1877 when the colonial administration relocated their headquarters from Cape Coast to Accra for varied reasons (Grant & Yankson, 2003). The reasons for the relocation from Cape Coast to Accra included health-related issues (i.e. building up a newer administrative centre was a way of protecting the Europeans from native-borne diseases) as well as geographical factors like shallow ocean berth at the Cape Coast for docking back then of vessels for transporting raw resources to Europe and beyond (Grant & Yankson, 2003). However, the selection of Accra as the next colonial headquarters was not based on pre-existing economic advantages as was the case for other West Africa sub-region cities like Abidjan and Dakar. The main characteristics of the spatial organization of colonial Accra were basically its arrangements around a sea port that connects the then Gold Coast economy to that of England; and restrictive zoning and building codes to distinguish orderly European areas from the natives living areas. The colonial government, to a certain degree, neglected urban planning in native districts which led to their overcrowding, cluttering and congested environment with poor structures and unhealthy conditions. The colonial administration ensured a rigid policy on residential segregation which distinctively demarcated the European residences like Ridge and Cantonments. These European residential areas were luxurious homes, golf and polo parks, tennis court amenities, and colonial health facilities. The colonial government more or less maintained a city within a city.

Post-Independence era

After independence of Ghana, the erstwhile European Central Business District (CBD) was de-Europeanized and nationalized politically and economically (Grant & Yankson, 2003). Ghana, under the leadership of Kwame Nkrumah, prioritized housing as its core mandate to the people regarding housing as a social right and the responsibility of the government to provide for citizens. As a result there was a huge public investment in housing through government policy. For example, under the 1959-1964 Development Plan, the government proposed to build 6,700 housing units: 200 units for middle income households, 1500 for low income households and 5000 units for very low income people like labourers (Arku, 2009). Later, in the seventh (7th) Development Plan between 1964-1970 another 60,000 housing units were to be built throughout the country at a total sum of €44.5 million. To facilitate the construction of the housing, many State owned enterprises were set up including the Tema Development Corporation, Ghana National Housing Corporation (GNHC), State Housing Corporation together with Bank for Housing and Construction (BHC) and Low Cost Housing Committee (LCHC) (Arku, 2009).

In the late 1980s, the housing system in Ghana was segmented into two: formal and informal sectors. The formal sector consisted of two sub-sectors namely public and private (Arku, 2009). The formal public sector was for the provision of housing for the middle classes while the private sector operated for profit purposes for the upper classes. The informal sector of the housing system targeted the low-income group and also divided into two sub-sectors: self-builders and small-scale enterprises, which could be an individual (Arku, 2009). The informal sector accounted for approximately 80% of the total national housing stock in Ghana (Arku, 2009).

3.1.1 Residential development in Accra city

In recent years, Accra just like any of the cities in the Global South is continually experiencing residential development expansion fuelled by a combination of factors like capita forces of trade, provision of physical infrastructural services, and investment and foreign currency liberalization initiatives (Grant & Yankson, 2003). The emergence of gated housing developments in recent years with resort amenities fuelled spatial inequalities between rich and low-income areas (Oosterbaan et al., 2012). The housing growth within Accra is not limited to the central part of the city but now engulfed sharply the peri-urban areas, where the

formalization of customary land tenure accounts for growing housing market operated by private real estate developers (Oosterbaan et al., 2012). Rapid peri-urban growth in Accra is characterized by a complex land market which combines both elements of customary land tenure and statutory planning procedures as well as the shift from societal perception on land from being a social good to a tradable product (Ardayfio-Schandorf, Yankson, & Bertrand, 2012). The peri-urban zones in Accra have also experienced a higher housing densities due to expatriate Ghanaians and recently arrived migrants in need of cheaper residential accommodation (Oosterbaan et al., 2012).

Many cities in the Global South have large areas of informal developments, which can exceed the level of planned developments (Kuffer & Barros, 2011). According to prediction by United Nations (UN) by the year 2035 more than 50% of the global population would live in informal settlement areas. Table 3-1 describes the differences between planned and unplanned developed areas as in Kuffer & Barros (2011).

Planned neighbourhoods: These are formal development areas which comply with urban planning standards and regulations. In these development zones, the emphasis is to promote a coherent spatial structure with streets and building layouts as a fundamental principle in planning schemes. Streets in these kinds of neighbourhoods are open and accessible to all (Babatunde, 2015). Unfortunately, in the case of Accra, it is observed that peri-urban development has overwhelmed local planning authorities and this results into haphazard manner of developments due to lack of human and technical competences (Doan & Oduro, 2012), resulting in blighted settlements within and around the Accra.

Unplanned neighbourhoods: In unplanned development, neighbourhoods are characterized by illegal structures with inadequate basic infrastructural services including water, electricity, housing, proper roads for inhabitants to enjoy life (UN-Habitat, 2002). There is also limited public spaces for proper interaction and relaxations for dwellers. Table 3-1 depicts details of spatial characteristics of planned and unplanned areas.

Table 3- 1: Spatial characteristics of planned and unplanned areas

Type of areas	Spatial characteristics
Planned areas	❖ Low –moderate density areas ❖ Regular layout of patterns (orderly road development and compliance with setback rules and regulations) ❖ Provision of public (green) spaces within the vicinity of residential areas ❖ Generally large sizes of buildings
Unplanned areas	❖ High density areas (roof coverage densities spanning 80% and above) ❖ Organic layout structures (no orderly development of roads and non-compliance with setback rules and regulations) ❖ Inadequate public (green) spaces within the vicinity of the residential areas) ❖ Sub-standard building sizes

Source: (Kuffer & Barros, 2011)

3.2 Selection of case study area

The selection of the study area was informed by two main reasons, that is, its locations in a peri-urban area close to a road highway which recently has been expanded as well as its rapid residential development, which contributes to the emergence of spatial and socio-economic dynamics in the area. Housing development constitutes a major part of structural expansion of Accra, with individuals ready to build in areas yet to be serviced, in anticipation of future provision of services (Briggs & Yeboah, 2001). This has

the potential of leading to an informal development. It is estimated that 50% of houses built in Accra came into being without planning permits. A big chunk of residential development in peri-urban zones in Accra has been rapid and uncontrolled, with serious repercussions for their management (Ardayfio-Schandorf et al., 2012). Most studies carried out in peri-urban areas of Accra have alluded that the conversion of agricultural land is basically for residential uses. This development threats the basis of livelihoods of the indigenous residents of the old villages in the peri-urban zones, especially the poor (Yankson & Gough, 1999; Kasanga et al., 1996) as agricultural land is continually being converted into non-agricultural uses at an alarming rate.

It is observed that with all the rapid physical development of Accra city, such development had not been done according to a consistent and coordinated planning, especially its peri-urban districts' development is done before any planning scheme has been prepared (Yankson & Gough, 1999). The growth of the city of Accra has been fragmented and with emergent informal developments in its planning process. For example, the population density in informal areas in the city is considerably higher (607.8 residents per hectare) than that of the entire city's (250.7 residents per hectare) (Ghana Statistical Service, 2012).

Kasoa as a satellite town to Accra experienced rapid population growth of 863 in 1970 to about 34,719 and 69,843 in 2000 and 2010 respectively (Ardayfio-Schandorf et al., 2012). This phenomenon has created high demand for infrastructural development, especially roads expansion, as residential development has swollen in recent years. This eventually leads to both spatial and socio-economic dynamics and informal planning in Kasoa as a peri-urban zone (Ardayfio-Schandorf et al., 2012). The communities selected for the study in peri-urban Kasoa include Tuba (Ngleshie Amanfrom) and Mataheko (New Weija). The purposive selection of the peri-urban communities within the enclave of Kasoa was informed by the following: they lie adjacent to the Accra-Cape Coast toll road highway. The road was expanded by Ghana government in 2008 with donor funds as a way to ease traffic congestion from Greater Accra to Central regions and to facilitate the movement of goods and people between regions and beyond. Also, in terms of spatial characteristics, Tuba appears to be serviced with good physical infrastructure or buildings, road networks, green spaces, water, electricity, sanitary facilities among others, which is an indicative of a high-income residential area. On the other hand, Mataheko community, which lies opposite Tuba, appears to have a resemblance of an informal settlement or a slum as its development in most parts is in a haphazard manner and it is serviced with poor roads, bad sanitation, less green space and more low quality physical infrastructure or housing, where the poor tend to live in mostly. Based on the above descriptions through field observations of the different physical characteristics of the two communities on 6th to 8th October, 2018, Tuba can be classified as a richer community area and Mataheko as the poorer community area (see Table 3-2 and Figures 3-2, 3-3 and 3-4 (a-b)).

Table 3- 2: Physical characteristics of Tuba and Mataheko

Community	Spatial characteristics
Tuba	❖ Good road network layouts – the interior roads are well connected to properties within the community though untarred. ❖ Good physical housing infrastructure –the houses are of good quality ❖ Provision of green spaces within the vicinity of residential areas – the community has more available green spaces. ❖ Good sanitation – the sanitary conditions in the community appears good with drains built at vantage areas for discharge and disposal rainwater and human effluent from households.
Mataheko	❖ Poor road network layouts within the community, which limits access to facilities within the area.

	❖ Poor physical housing infrastructure- most of the houses within the community are of low quality displaying slum-like conditions. ❖ Lack of green open spaces – the community has less green environment for other uses. ❖ Poor sanitation – the sanitary condition within the community leads much to desire as there are no proper drains constructed in it for the discharge of human effluent and surface water.

Source: Field observation, 2018

3.3 Research design and approach

The ultimate aim of this study is to understand residential development dynamics due to road expansion in peri-urban areas in Accra city. In this context, this study adopts a case study approach for the cause-effect of its objectives and questions (Bryman, 2012). A case study design is an experiment analysis which aims to find out about any contemporary matter in an actual dimension (Yin, 2013). The case study in this research helps to know the residential development dynamics in peri-urban areas due to road expansion.

This study employed a mixed method research approach for data collection and analysis through the combination of qualitative and quantitative (QUAL-QUAN) methods (Bryman, 2012) and spatial methods. Different reasons are given by different researchers for adopting a mixed method approach (Creswell, Shope, Clark, & Green, 2006). These include triangulation, where both qualitative and quantitative methods complement each other. In this study, in particular, the mixed method approach both in the collection and analysis of the data was used for triangulation and completeness for the operationalization of objectives and questions. Questionnaires were used to collect data for the quantitative analysis. This study adopted semi-structured interviews for professionals and academics in physical urban infrastructure related sectors on how local planning and policy, road expansion has shaped and influenced residential development in the communities and what spatial and socio-economic dynamics emerged in the communities due to road expansion for qualitative analysis. For spatial analysis, satellite imagery from Google Earth before and after the road expansion were used to visually interpret any spatial changes which emerged as a result of the road expansion.

In this study, the selection of relevant and reliable indicators to measure residents' perceptions with regard to the impact of road expansion on socio-economic, public services and physical infrastructure domains; perceived impact of road expansion on living conditions and the level of effect on integration in the peri-urban communities due to road expansion was through review of literature and adjusted to the local context of the case area (Berhe, Martinez, & Verplanke, 2014). This allowed the identification of three (3) indicators each to measure the impact of road expansion on socio-economic, public services and physical infrastructure domains, five(5) indicators for living conditions and ten (10) indicators on integration in the two peri-urban communities (see Table 3-3 and Figure 3-8).

Table 3-3: Domains and indicators to measure residents' perceptions on impact of road expansion, living conditions and integration for analysis

Domain	Indicators	Description
Socio-economic	Level of crime	Rate of robbery, stealing
	Accommodation cost	Rent of residential apartments
	Cost of living	Prices of food products in the market
Public services	Public transport services	Access to transport services
	Health facilities	Access to health services
	Primary schools	Access to basic education services
Physical infrastructure	Provision of electricity	Access to electricity
	Provision of water	Access to potable water
	Provision of drainage systems	Availability of drains, gutters
Living conditions	Getting of income	Earn money from business activities
	Getting of job	Access to employable opportunities
	Daily expenses	Money require to cover daily living cost
	Daily business	Available commercial/trading activities
	Daily movement	Ability to travel round
Symbolic integration	Sense of pride	Feelings about one's physical environment
	Sense of belonging	Feel belonging to a neighbourhood.
	Level of friendliness	Relations with others in a neighbourhood
Community integration	Interaction within community	Networking with community members
	Asking for help	Access to support from others in a place.
	Knowing one another in the community	Social ties with others in a community
	Interacting with other neighbourhoods	Visiting of neighbours/relatives in other places
Functional integration	Provision electricity	Access to electricity connections
	Provision of water	Access to potable water
	Provision of drainage systems	Availability of drains, gutters

(Khaef & Zebardast, 2016; Berhe el at., 2014; Ruiz-Tagle, 2013; Blanc, 2010; Sabatini & Salcedo, 2007)

3.4 Data sources and methods

This study made use of both primary and secondary data. Secondary data included aerial images, census data (2010), GIS boundary shapefiles of the communities from Ghana Statistical service (GSS) as well as reports and grey-literature. The aerial image, derived from google earth is used to classify the richer and poorer community areas in terms of the spatial characteristics. This was validated through fieldwork observations from 6th to 8th October, 2018. The primary data collected in the field include interviews with key informants (KIs), focus group discussions (FGDs) and questionnaire administration. Table 3-4 shows a summary of the data types used, their format and sources.

KoBoToolbox[1] was used for the administration of the questionnaire in the field from the 14th to 24th October, 2018 to residents who lived in the communities during the road expansion. For execution of the analysis, tools such as ArcGIS, Excel and the Software Package for Social Science (SPSS) were employed in doing so. The interviews of the KIs and FGDs were transcribed and analyzed using Atlas.ti software. Similarly, literature review complementing the interviews of the KIs was used to explain how has local planning and policy, road expansion both shaped and influenced residential development in the city. Same applied to the spatial and socio-economic dynamics which emerged in the two communities due to the road

[1] https://www.kobotoolbox.org/

expansion (see Figure 3-8). The final version of the questionnaire was then transferred into an electronic data collection software called KoBoToolbox. This data collection software tool is an open-source kit owned by Proxy Protection LLC for collecting and submitting geotagged forms, survey data, pictures, audio and videos to a central project website as according to Proxy Protection LLC, 2018.
This process involved creating a google account for the project (e.j.adugbila@student.utwente.nl), creating a project website at KoBoToolbox.org, naming and designing the questionnaire (Accra-Kasoa Road Expansion) for the data collection. This followed the downloading and installing of KoBocollect App into three (3) Android mobile phones to be used for the collection of data and the KoBoTool project designed form loaded into the Android mobile phones for the survey. The forms in KoBoToolbox were modified with comments by the field assistants during the pilot phase. The data collection was conducted in different ways (online-offline) and each day entries were uploaded into the main website and later downloaded from the main website (online) to check for any inconsistencies. Appendix 1 shows the systematic process to create and use the KoBoToolbox software.

Table 3- 4: Summary of data types used, their format and sources

Type of data	Format	Acquired date	Source
Aerial Image	Images	2008, 2018	Google earth
Population data	Excel (.xls)	2010	GSS
Boundary of communities	Vector (.shp)	2010	GSS
Roads	Vector (.shp)	2010	OSM
How has local planning and policy shaped and influenced residential development?	Interviews, reports	October 2018	Key informants
How has road expansion shaped and influenced residential development?	Interviews, reports	October 2018	Key informants
What are the prevailing types of residential development due to road expansion in peri-urban communities?	Observation, descriptions	October 2018	Field
What are the spatial and socio-economic dynamics in peri-urban communities due to road expansion over time?	Interviews of KIs	October 2018	Key informants
What are the variations in the spatial and socio-economic dynamics in peri-urban communities?	FGDs	October 2018	Field
What are the perceptions of residents with regard to the impact of road expansion?	Questionnaire	October 2018	Field
To what extent does road expansion as perceived affect living conditions of residents?	Questionnaire	October 2018	Field
What is the level of effect on social integration in peri-urban communities due to road expansion?	Questionnaire	October 2018	Field

3.5 Pre-fieldwork stage

The stage of the research involved preparation for fieldwork via a thorough literature review of existing studies on the impact of road expansion in peri-urban areas and is akin with residential development dynamics. During this stage of the research, the map of the study area was prepared and the selection of the two communities was done. The design of the interview guide for KIs, FGDs and questionnaire (see Appendices 2 and 3) were developed based on the research objectives and questions.

3.6 Fieldwork Stage

This stage of the research was fundamentally utilized for primary data collection. During this phase several tasks were executed, namely:

- Reconnaissance survey of study area
- Sampling strategy
- Recruitment and training of field assistants
- Key informants interviews
- Focus Group Discussions
- Questionnaire Survey

3.6.1 Reconnaissance survey of study area

A field reconnaissance was conducted from the 6th to 8th October, 2018. This entailed visiting the two different communities in the study area to make general observations, to get a conceptual view of the communities and take photographs. This also helped the author to familiarize with the environment of the study area. During this field reconnaissance, the local names of areas under study were obtained for easy entry and data collection.

Figure 3- 2: Photographs of Tuba community (*Source: Adugbila's fieldwork, 2018*)

Figure 3- 3: Photographs of Mataheko Community, 2018 (*Source: Adugbila's fieldwork, 2018*)

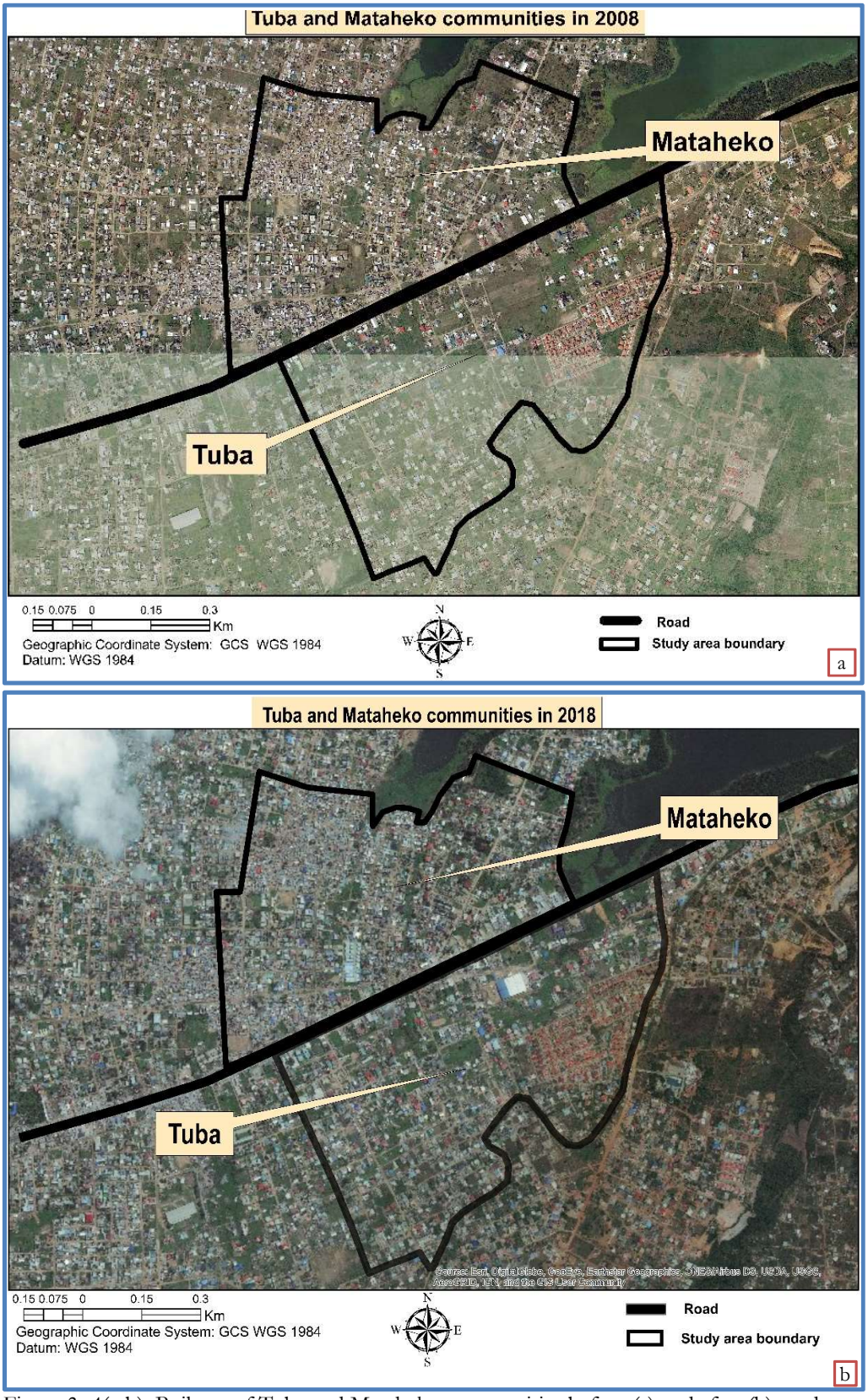

Figure 3- 4(a-b): Built up of Tuba and Mataheko communities before (a) and after (b) road expansion (*Source: Google Earth, 2008 and 2018*)

3.6.2 Sampling strategy

This study used purposive, convenience, snowball and stratified sampling techniques. Purposive sampling was applied for the selection of the peri-urban communities for the study in the city with certain physical characteristics and also for ease data collection given the short time available.

Purposive and snowball samplings were used to select key informants in order to allow experts with experience and insight information on the subject matter to come to bear. For the selection of respondents for the FGDs, both purposive and snow sampling techniques were used. The respondents for the FGDs were opinion leaders and residents who lived in the communities and saw the road being expanded. This was to derive their lived experiences and perceptions of the widening of the road, also to eliminate biases during the discussions. The surveyed questionnaires in a form of closed-ended Likert scale 1 to 5 with options to explain selection of choices were administered to gather perceptions of residents with regard to the impact of road expansion, perceived impact of road expansion on their living conditions and the level of effect on integration due to road expansion in their communities (Sabatini & Salcedo, 2007). In total, 155 questionnaires each of the two communities were administered. To ensure spatial distribution of responses from residents, the stratified sampling technique was slightly adapted to the characteristics of the two communities. In both cases of the communities, convenience sampling was adopted to reach respondents because it was difficult to identify as many residents as possible who were living in the communities at the time of the road expansion. In the light of this, the author combined convenience, snowball and stratified sampling techniques for the administration of questionnaire to residents in order to reach out to many respondents as possible within the short time to the researcher and to achieve spatial distribution. With the stratified sampling, the communities were zoned for the purpose of having a spatial distribution and to avoid clustering of responses.

3.6.3 Key informants

The interviews of the key informants were conducted on the 15th, 17th, 18th, 20th and 23rd October, 2018. The interviews of the KIs were meant to gain insight into how local planning and policy and road expansion has shaped and influenced residential development in the city and about the spatial and socio-economic dynamics which emerged in the communities due to the road expansion. The interviews were conducted using semi-structured guiding questions and were either audio recorded or notes were taken and later transcribed depending on the consent obtained from the KIs. According to Bryman (2012), semi-structured interviews serves as a source for in-depth discussions to attain rich information and are flexible means for the researcher to ask follow up questions. The interviews conducted provided additional information that was not covered through literature review of existing studies.

The interview was divided into three different parts. Part one was on how local planning and policy has shaped and infuenced residential development in the city. Part two focused on how road expansion has shaped and influenced residential development. Part three was on the spatial and socio-economic dynamics which came up with the road expansion in the peri-urban communities in the city. Table 3-5 indicates details of KIs interviewed.

Table 3- 5: List of Key informants interviewed

Interview type	Status of KIs /Department
Key informants	Senior Lecturer at University of Ghana, Geography and Resource Development
	Director, Planning and Development at Ghana Highways Authority
	Physical Infrastructure Consultant – Chief Executive Officer, Delin Consult
	Ga-South City planner, Ga South Municipal Assembly
	Physical City Planner, Awutu Senya East Municipal Assembly
	Community Elder, Amanfrom Community
	Public Relations Officer, Ghana Real Estates Developers Association

3.6.4 Focus group discussions

Two FGDs were also conducted at Mataheko and Tuba on the 17th and 24th October, 2018 respectively. These were composed of five (5) opinion leaders from each of the communities to express and share their experiences on variations of the spatial and socio-economic dynamics which came up in them due to the road expansion (see Appendix 2). The demographic composition of the two FGDs is shown in Table 3-6. Semi-structured questions were used to guide the discussions and consent was sought to audio record for transcription and take photographs of the process for onward use in this report. However, the FGD for Tuba was not audio recorded because one member objected to that and so hand written notes were taken together with photographs. Table 3-6 and Figure 3-5 (a-b) throw more light on the details of FGDs.

Table 3- 6: Demographics of FGDs Participants

Community	Demographics of participants		
	Gender	*No.*	*Average age of Participants*
Mataheko	Male	3	48
	Female	2	40
Tuba	Male	3	45
	Femle	2	42

Figure 3- 5(a-b): Photographs of FGDs at Tuba (a) and Mataheko (b) (*Source: Adugbila's fieldwork, 2018*)

3.6.5 Recruitment and training of field assistants and piloting of questionnaires

Three field assistants for the data collection were recruited and trained. The criteria to recruit the field assistants were that they were to be university graduates with ample experience on data collection. The field assistants were trained on ethics of data collection as well as on the use of the KoBocollect software[2] for the data collection to guarantee data quality. The training entailed going through the questionnaire with the assistants to ensure understanding of the questions and coming up with commonly used local terms to be used by the three field assistants to ensure respondents' clear understanding of each questions. After training on the 12th October, 2018, a pilot test was carried out on the 13th October, 2018 in the Mataheko community (see Figure 3-6 (a-b)). This served to test the questions and the strategy samplings to be used during the actual questionnaire administration. Through the pilot test the researcher was able to adjust the necessary concerns before the actual actual data collection. Figure 3-6 (a) shows the researcher training field assistants for the survey and Figure 3-6(b) shows a field assistant piloting a questionnaire in one of the communities.

[2] http://www.kobotoolbox.org/

Figure 3- 6(a-b):Photographs on training of field assistants (a) and piloting of questionnaire (b) (*Source:Adugbila's fieldwork, 2018*)

3.6.6 Questionnaire survey

The questionnaire was administered to gather the perceptions of residents with regard to the impact of road expansion, impact of road expansion on living conditions of residents and the level of effect on integration due to road expansion in the peri-urban communities. According to Bryman (2012), questionnaire administration is an important tool of data collection since data collected can be aggregated and quantified to provide a fixed range of answers, particularly if closed ended questions are used. The questionnaire for this study had both closed and open ended questions prepared using 5 likert scale (Appendix 3). The questionnaire consisted of four parts which included:

Part 1: Perceptions of residents with regard to the impact of road expansion: This part covers the opinions of residents on specific domains before and after the road widening in their communities. The domains from literature include socio-economic, public services and physical infrastructure with their specific variables (see Appendix 3).

Part 2: Impact of road expansion on living conditions of residents: This section of the questionnaire also focused on the effect of the road widening on living conditions of residents to compare before and after the widening. The variables in this case included residents chances of getting income, jobs, level of daily expenses and daily movement before and after the road widening. This is to empirically know the trends of these variables.

Part 3: Level of effect on social integration due to road expansion: The questions in this part sought to establish the effect of the road widening on the social integration within the communities, limited to symbolic and community integration. Under symbolic integration, the variables included: sense of belonging and sense of pride as a member of a community and the community integration focused on the social networks (Sabatini & Salcedo, 2007).

Part 4: Respondents' characteristics: This section of the questionnaire covered the age, gender, level of education of the respondents and time stayed in the community by the respondents.

A total of 310 questionnaire were adminstered and geocoded for Tuba and Mataheko community areas. The survey was done both in weekends and in weekdays as the target was to get residents who lived before and after the road expansion and not just households. For a clear visualization and the spatial distribution of geocoded of the surveyed responses of the communities, the case area was divided into two parts (see Figure 3-7). The researcher ensured that the questionnaire administration was carried out completely in one community before moving to the other.

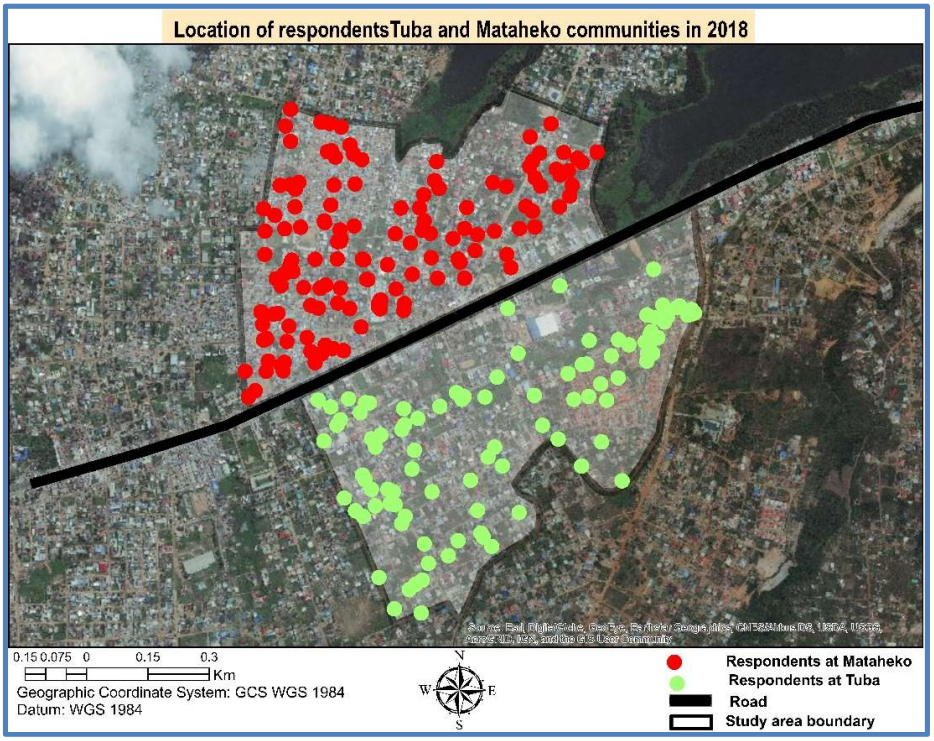

Figure 3- 7: Responses at Tuba and Mataheko (*Source: Google Earth, 2018)*

Characteristics of Respondents

The total number of respondents were 310. To be qualified for the survey, the respondents had to be 18 years and above,who lived in one of the communities before and after the road expansion. The number of male (n=170; 55%) was slightly higher than that of the female (n=140; 45%). Most of the older respondents were between 41 and 65 years old (n=249; 80%) and the youthful respondents were between 18 and 40 years (n=61; 20%). The majority of the respondents had education up to secondary and post-secondary level (n=127; 41%), followed by respondents with primary eductaion level (n=120; 39%) and minority of the respondents had education between first degree and post-graduate degree (n=63; 20%).

3.7 Post-fieldwork stage

This phase of the research entailed processing, analyzing and interpreting the qualitative and quantitative data collected in the field to answer the research objectives and questions. The transcribed interview documents were used for analysis and discussion on how local planning and policy and road expansion have shaped and influenced residential development, and the spatial and socio-economic dynamics which came up with the road expansion in the peri-urban communities in Accra city.

3.8 Data analysis methods

Perceptions of residents on impact of road expansion

The qualitative data on perceptions of residents with regard to the impact of road expansion in peri-urban communities from the open-ended questions in the surveyed questionnaire were transcribed into a word document and analysed using Atlas.ti software to reveal the trends of the data to support the statistical data. This is in line with the study by Khaef & Zebardast (2016), who used survey responses to validate statistical findings on different aspects of quality of life deterioration in Tehran city. In addition, the quantitative data from the structured questionnaire survey were analysed using descriptive statistics such as mean, standard

deviation together with graphs, tables and charts to show percentages for better understanding and clarification of the real impact of the road expansion across the communities.

Mean scores were computed to aggregate the residents' perception per domain in each community and obtain the overall residents' perception to rank the two peri-urban communities (Tesfazghi, Martinez, & Verplanke, 2010) for before and after the road expansion. To analyse the variability of residents' perception per domain, Coefficients of variation (CoV) were used, by dividing standard deviation by the mean scores per domain and overall perceptions of the domains of before and after the road expansion. Questions in the questionnaire were rated using the Likert scale format 1-5, where 1 means very high and 5 very low and 3 refers to neutral. Some questions in the questionnaire, for instance travel to reach public transport services also rated with the same scale format 1-5 with 1 very far and 5 very close, and with other questions with same Likert scale 1-5, where 1 stands for strongly agree and 5 stands for strongly disagree and 3 for neutral (see Appendix 3).

Level of effect on integration

The qualitative data was transcribed into a word document and Atlas.ti was used to analyse that to reveal the trends in the data. The quantitative data was loaded into SPSS to compute the means, standard deviations and coefficient of variations on the perceptions of residents. Three dimensions of integration were used as adapted by Sabatini and Salcedo (2007) to analyse the level of effect on integration in the two peri-urban communities due to the road expansion. Three (3), four (4) and three (3) indicators for symbolic, community and functional integration respectively as shown in Table 3-3. An overall integration mean score was computed for all the ten (10) indicators of the three dimensions of integration to rank the peri-urban communities (see Table 4-3).

3.9 Ethical considerations

Research ethics were observed and applied not to only protect the rights of participants but to ensure sanctity of the research itself through a logical undertakings (McKenna & Gray, 2018). In this context, the researcher has obtained a support letter from the University of Twente regarding the research and presented it to all relevant respondents before participation. The researcher gave a full explanation for the collection of the data to all respondents. The informed consents of respondents were sought for their involvement in the research and a full disclosure of the consequences of the research to the community and the stakeholders for their information given for analysing and reporting in the research. The researcher also followed ethical protocols during the questionnaire and interviews sessions. Permission was sought from the local authorities such as the Assembly Members, Municipal Authorities of the communities before questionnaire survey. Both key informants and FGDs members were given prior notices for agreement on appointment of meeting times and venues to have the interview sessions. Data collected for used in the research have been duly acknowledged.

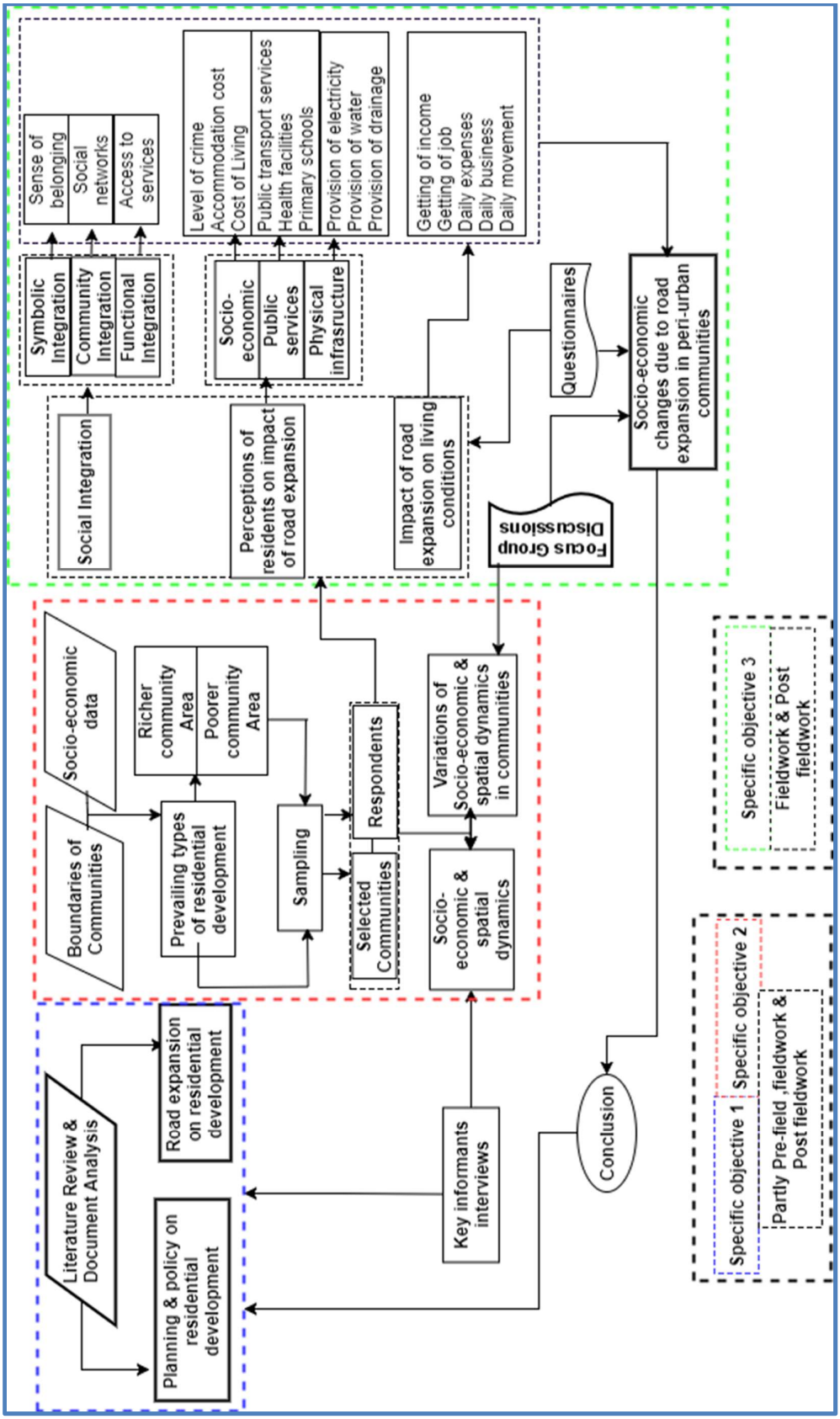

Figure 3- 8: Overall methodology workflow

4 RESULTS

This chapter presents results of the residential development dynamics in peri-urban communities in the city of Accra due to road expansion and its impact on living conditions and integration of residents. The findings are based on the research objectives and questions.

4.1 Local planning and policy influence on residential development in Accra

One of the dimensions the thesis looked at was to explore how local planning and policy shape and influence the residential development in Accra over time. In Ghana, the Local Government Act (Act 462) 1993 empowers district assemblies as the sole planning authorities to ensure orderly physical development within their areas of jurisdictions through the Town and Country Planning Departments (TCPD). This Act empowers various Metropolitan, Municipal, District Assemblies (MMDAs) and TCPD units to prepare planning schemes to regulate physical infrastructural developments within their territories. However, findings from the in-depth interviews with key informants reveal that the communities under study have no planning schemes prepared by the statutory planning authority (TCPD) under the Assembly to regulate their physical development, rather the chiefs[3] in these communities performed such role through their contracted surveyors. One of the key informants said:

> *"What do you mean, planning of these areas? We get our surveyors and pay them to demarcate the lands for us. You mean we should get in government again? No, it is government that gave the land back to us, so we now need to plan it ourselves. At the time government was having power over the land then institutions like Town and Country Planning Department can do whatever they wanted on the land, but this time it is our property. We only know that they give building permits to developers who submit the designs of their buildings to them, and they inspect buildings of people in the area here to be sure that they use the right materials to put up their houses but they do not decide what a particular piece of land should be used for. We hear that the Assembly also collect rates from building owners. But for development, the chiefs have our way of doing that. We provide you the land knowing that it is okay for what you want to do with it. Our surveyors know what to do, to get everybody satisfied with his or her piece of land. It is not the business of Town and Country Planning Department …….they do not own land here in the first place" -- Key informant 4.*

The physical planning authority in the city to some extent lacks the power to enforce development controls in the communities under study because the traditional authorities exercise such powers instead, leaving the statutory planning outfits the only option of issuance of building permits and collection of property levies. This to some extent has adversely affected the physical layouts of the communities in question.

In the year 1991, the Greater Accra Metropolitan rolled out a master plan. The main idea of that plan was supposed to protect green belt and natural boundaries of the city, by controlling its outgrowth not beyond the Weija Lake. There also exists the National Building Codes of Legislative Instrument (LI 1630) 1996, which requires residential developers to obtain development and building permits from physical planning authorities before any structural development. However, the findings reveal that the problem with these planning rules and regulations is lack of enforcement of such codes to properly regulate physical development including that of residential development. This is because the city planning authorities are overwhelmed with the pace of development hence de facto physical development in the city precedes

[3] Chiefs are persons who hail from appropriate family and lineage, who has been validly nominated, elected or selected and enstooled, enskinned or installed as chiefs in accordance with relevant customary laws and usage, according to the 1992 Constitution of Ghana.

planning, including its peri-urban areas. The city planning agencies like the Town and Country Department, now called the Spatial Planning Development Authority, lack the necessary work force and material resources to deliver their mandates in planning areas to ensure an orderly physical development in the city. Hence the outgrowth of the residential development of Accra city. According to informants, the Weija Lake at the western part of Accra was supposed to be the natural boundary beyond which no developments are to take place. However, this situation has not been accomplished due to lack of enforcement of existing physical planning legislations in the city and the country for that matter, despite the good physical planning laws and policies.

Similarly, Figure 4-1 (a-b) reflects the patterns of residential development which are emerging in Accra peri-urban areas due to lack of enforcement of physical planning regulations and parallel planning system being carried out by the chieftaincy institution and statutory planning authorities in certain parts of the city. Therefore, all these culminated into informal settlements in certain locations of Accra peri-urban. The key informants pointed out that the informality in terms of development in certain peri-urban communities in Accra city is due to the complete control of physical planning processes by traditional authorities, as one key informant expressed that:

> *"The communities you are looking at are not under our control since the lands were given to the chiefs by President Kufuor, the chiefs are controlling the lands themselves, and the chiefs are their own planners. That is why you are seeing a lot of informal developments there like that, with poor interior road networks in most places. The planning office here has no planning schemes for them and has nothing to do with those communities in terms of their layouts, so is a big problem" – Key informant 2.*

The chiefs as symbols of traditional authority in the communities dictate their physical development paradigm instead of the statutory planning institutions as stipulated in the Local Government Act,1993 (Act 462). This therefore results into informal developments in certain parts of the communities due to absence of proper planning schemes to control and manage physical development (see Figure 4-1(a-b)).

Figure 4-1(a-b): Informal settlements in Mataheko community (*Source: Adugbila's fieldwork, 2018*)

Figure 4-1(a) shows the poor nature of roads and Figure 4-1(b) shows a cluster of haphazard developments due to poor physical planning layout in one of the communities as the chieftaincy institution is in control of physical planning, and decides what development takes place without the TCPD as a statutory planning regulatory body.

4.2 Road expansion shape and influence residential development in Accra city

The second dimension this thesis examined is how road expansion shaped and influenced residential development in the Accra city, with specific attention on the Accra-Kasoa road expanded in 2008. Roads are means of facilitating the movement of people from one location to another in order to reach destinations of opportunities (Pradhan & Bagchi, 2013). Findings from the interviews with key informants indicate that road expansion attracts people to locations to settle and live in. Previously, Kasoa was a small town with migrant traders from the northern part of Ghana but due to the road expansion by government it became a cosmopolitan community 'overnight' with massive residential development. Thus when the Accra-Kasoa road was expanded it changed the urban form of residential communities along it and attracted the middle-income residents, who can afford to drive to move in there. This process led to some gated communities springing up such as Blue Rose, Blue Gate, Adom estate and Iron city estates (Figure 4-2 (a-b-c-d)). For example, a key informant stressed that in 1970 and 1984, the population of Kasoa was 863 and 2,597 respectively but it reached 34,719 in 2000 and 69,834 in 2010. This meant that the town is growing leaps and bands and road network expansion is one of the reasons for its growth, though other reasons account for that such as population growth. A key informant expressed that:

> *"Thus why saying, roads are the main points of attraction. It is roads that attract people to a settlement. People were coming to Kasoa to buy land but they were not developing them because they didn't see the need to come and build and later they will be hustling to come. Even just a few people who were giving the benefit of the doubt who were just risking to buy land in Kasoa. But a few years ago when this road got expanded we saw a number of people who quickly ran into Kasoa to have a house for themselves simply because there is accessibility. They can easily link up with Accra and come back freely. So the link is very strong, so you know it is roads that make a community develop. Basically it is roads that make community develop, if you have less than a road within a community, the community will hardly develop. But the more roads are being put, then people are being attracted to come in and settle within the community, because they now feel free to go out and come in, anytime they want" – Key Informant 3.*

The expansion of the Accra-Kasoa road led to the rush of people from the city of Accra to start building on their vacant plots in Kasoa they purchased some years ago, because the traffic situation from Kasoa to the city had improved considerably. This has therefore led to further residential development and shaped the urban form of communities around and in Kasoa, with the emergence of gated estates (see Figure 4-2(a-b-c-d).

The road expansion also opens up Kasoa as a town linking it not only to other parts of the Accra city but beyond. Thus accessibility to Kasoa improved and travel time reduced to about 15-20 minutes to and from Accra central to reach Kasoa as compared with the 3-4 hours travel time spent before the road expansion. This motivated a lot of dwellers into communities around Kasoa to enjoy serene environment and isolate from urban noise from Accra city centre because of the road expansion, making it convenient to live there and still travel to work at the city. A key informant reiterated that: "*As the road was expanded people were now rushing to get a parcel of land to build in Kasoa because they can move in and out to their workplace. At the end of the day the road expansion has influenced land uses, let say residential use"—Key informant 2.* A lot of people moved to build their residential apartments in Kasoa when the road open up the accessibility level into it, making it easy to travel to the city centre within 15-20 minutes to participate in daily activities there.

Figure 4-2 (a-b-c-d): Red Roof (a), Adom (b), Blue Gate (c) and Iron city (d) estates in Tuba and Mataheko --(*Source: Adugbila's fieldwork, 2018*)

Figures 4-2 (a), (b) and (d) are gated estates in Tuba and Figure 4-2 (c) is in Mataheko. It is mentioned in the FGDs that these gated estates sprung up immediately after the road expansion.

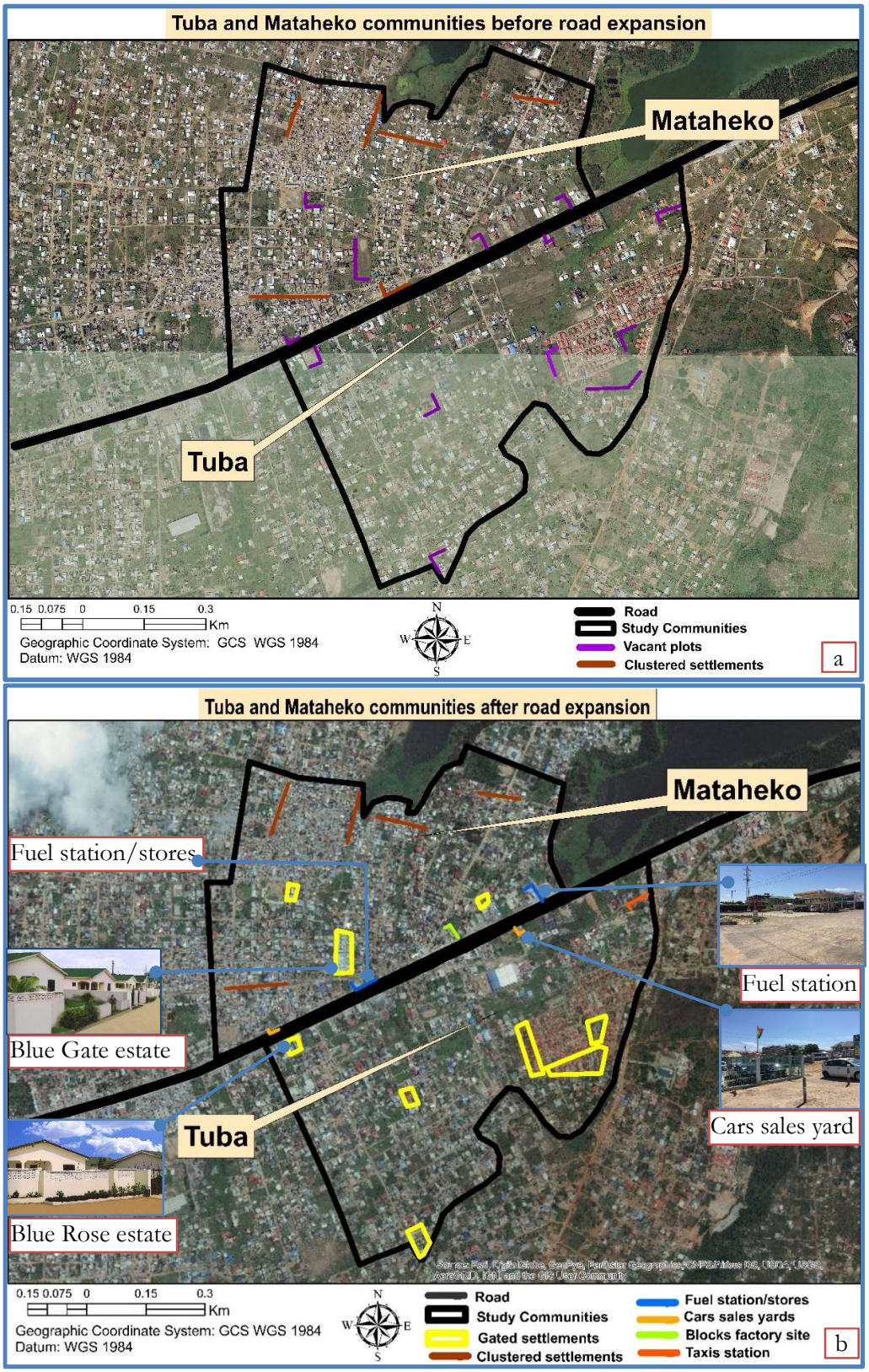

Figure 4-3(a-b): Satellite imagery showing land uses before and after road expansion in Tuba and Mataheko --(*Source: Google Earth, 2008 and 2018*)

Figure 4-3(a) shows the extent of physical development of the communities before the road expansion in 2008 and Figure 4-3(b) shows the extent of the present physical development in the two communities after the road to visualize and interpret the spatial development changes which emerged as depicted in Figure 4-3(a-b). For instance, Figure 4-3 (a) shows vacant plots for present Blue gate and Blue rose estates but Figure 4-3 (b) shows same plots now built-up with such gated settlements on them (See Figure 4-3(a-b)).

4.3 Driving forces of residential development in Accra peri-urban

This dimension of this thesis examined the driving forces of residential development within the city of Accra under the domains of land, infrastructure and opportunities as in the next sub-sections.

4.3.1 Land domain

The findings of this present study reveal that there are no available plots of land in the main city of Accra for residential development anymore, because it is heavily built up whereas peri-urban towns like Kasoa have vacant lands which can serve the residential needs of prospective developers. The customary wholesale of lands by chiefs also encourages real estate developers to grab lands they perceive to be prime lands to develop houses to let or rent to prospective individuals or companies. A key informants emphasized that:

> *"As I said it is a dormitory town we have land here, there are virgin lands that chiefs are selling out. Now, there is no land in Accra that is the driving force of residential development here in Kasoa. In terms of price also, the middle-income earners can afford lands and even some low-income earners can afford some of the lands compared to other Municipalities like East Legon and Adenta areas inside Accra town. But here it is affordable and people also want to have their own privacy as people do not want live in compound houses throughout their lives" – Key informant 2.*

The increasing residential development in Kasoa is due to the availability of land in communities in and around it for the upper, middle-income persons and even some low-income persons to own and develop as compared with towns such as East Legon, Kanda and Adabraka in the main city of Accra, where land is scarce and expensive. Hence there is a mad rush for plots of land at Kasoa for residential purposes by estate developers and individuals, especially the high and middle-income people.

Secondly, interviews with key informants reveal that the marketization of the Ghanaian economy due to the inception of the Structural Adjustment Programme (SAP) in the 1980s is also driving the residential development in peri-urban Accra and beyond. This has made traditional rulers in the persons of chiefs who control and hold land entrusted to them to put out land within their communities for sale to individuals or investors with the purchasing power to grab for development, especially for real estate. This is motivated by the expansion of road infrastructure in communities all over the country, as it is the case in Kasoa, where chiefs are selling out land, and real estate developers or individuals are rushing to own land there for residential uses, because the road infrastructure has made it easy to reach Accra city in about 15-20 minutes. According to one of the key informants, there is a series of radio and television advertisements wooing the general public to acquire land in Kasoa under the adage that it is just 15-20 minutes' drive away from Accra.

Thirdly, the high land values and prices of residential buildings within the city were found to be one of the driving forces of residential development in peri-urban Accra. Most people who cannot afford the high prices of residential properties to stay but want to live in Accra and continue to seek available opportunities there, opt to move to the peri-urban zones to purchase land there for development as prices there are a little lower compared with the city centre of Accra. In contrast, land prices appear moderately low at the peri-urban areas than the urban centre where both middle-income and low-income earners can stay and move to Accra central daily to work. One of the key informant emphasized that: "*Because in the city centre land is extremely expensive and so people are able to afford cheaper lands along the peri-urban. So immediately you develop the*

corridors (in terms of roads) it improves access for people and they find it easy to live in the places sometimes like I said almost 50km away but they still commute to the city centre" --- Key informant 6.

Land is not only scarce but expensive in Accra city, but available and relatively less expensive in Accra peri-urban which is within the reach of the high and low-income group of persons to own for development. Available and cheaper land is part of the causative factors driving residential growth in Kasoa over time now.

4.3.2 Infrastructure domain

The interviews with the key informants reveal that the urban centre of Accra has become so choked with human population due to migration of people from other parts of the country which comes with increasing demand for residential accommodation. Hence the residential infrastructural level of the city is not able to meet all needs and people who are unable to secure residential accommodation within the Central Business District (CBD) tend to move into the dormitory towns like Kasoa or Amansaman to purchase land and put up their own buildings or rent. A key informant reiterated that one million people enter Accra city each day from other parts of the country and beyond for various reasons, and that a lot of them do not go back to their originated destinations. A key informant expressed that:

> *"I think, Accra is a cosmopolitan, we have a very large number of people who troop into Accra and I think they are talking about close to a million come to Accra each day. But statistics also shown that a landmark of people stay behind and don't go back. But as to how or where do those people stay is another study on itself own, which am not sure if they have done any study to find out where yet those who come in and don't go back reside. But it goes to confirm the fact that there is a very huge housing deficit confronting the entire nation" – Key informant 7.*

The peri-urban zones within the city of Accra are experiencing massive residential development due to the spillover effect of demand for accommodation in the city centre caused by migration of people from every corner and nook of the country to Accra in search for green pasture.

Another key driving force of residential development in Accra city is the recent expanding of transport infrastructure especially roads in and around the city. Findings from key informants point to the fact that mass roads construction or expansion in the city serves as attraction points for people to move into settlement zones within Accra, especially in the periphery areas. It was gathered that areas in Accra which were not known to have massive residential development experienced a sudden increase in their residential built up following roads improvements in such localities, with a typical example being Kasoa. A key informant said: *"So when you expand the road to any peri-urban area, it is easy for people to move to live there, because either they can't get land in the city and is not expensive within these areas, people move to the peri-urban because they now have access. So that is what drives all these huge residential areas outside of our major cities"—Key informant 6*. It is noted that the road expansion in peri-urban areas serves as a conduit for people to move into them to settle because other opportunities tend to emerge within them making such zones liveable. This present study confirmed that the road expansion in Kasoa contributed to the outburst of its residential development over the years.

4.3.3 Opportunities domain

This current study also found out that one of the key driving forces of residential development in Accra city is the over concentration of national development opportunities and job opportunities in Accra by the Government of Ghana with little attention for other regional capitals. According to the Accra Metropolitan Assembly (AMA), Accra central alone hosts about 80% of all important facilities which are of importance to residents in the Greater Accra Region and beyond. This, therefore, drives a lot of people from every part of the Greater Accra and the country who desire to enjoy these facilities or get these jobs, to come and live

in Accra hence the high demand for residential units. However, those people who come to live in the city and may not be able to afford high rents in the city centre tend to move to the periphery towns like Kasoa to settle, and rather commute daily to access such opportunities in Accra. A key informant revealed that:

> *"The massive residential development in and around peri-urban Accra is due to the centralization of activities which is creating the massive residential development in Accra peri-urban. Lack of decentralization of opportunities by government across the country which is limiting the other regional capitals is driving people to come to Accra to stay and work. Every young graduate who finishes university would like to leave his village, district and come to Accra to look for a job; meaning he would need a place to stay when he gets a job. So when he gets a job then if he cannot afford to pay the high rents in Accra central as a beginner in life, he moves to the outer part of Accra to stay and come to work. The over concentration of activities in Accra is driving the population here and thereby the residential development"--- Key informant 5.*

This implies that distribution of national resources in Ghana is not evenly, as its capital town, Accra receives more resources than other towns. This, therefore, makes Accra peri-urban attractive zones for new residential settlers, who may be clamouring for their share of the national cake in the capital of Ghana.

4.4 Prevailing types of residential developments in Accra city

This section of the thesis identifies and explains the prevailing types of residential developments in the city based on the physical characteristics as in chapter 3 section 3.2. Classification of the residential development was obtained through field observations and using Google Earth data to identify physical characteristics of the residential developments through visual interpretation.

4.4.1 Classification and spatial distribution of residential development in the city

The prevailing types of residential development in Accra peri-urban due to road expansion can be classified into richer and poorer community areas. Figure 4-3 (a-b) depicts the two distinct prevailing types of residential development in the case area: richer and poorer residential community areas. The richer community area (Tuba) has a gated residential development and more green spaces in between as well as a good road network. However, the poorer community area (Mataheko) has a clustered residential development patterns with less green spaces and poor road network, with interspersed minimal gated apartments at specific locations.

Tuba community

This community is located at the southern part of Kasoa town towards the Gulf of Guinea. It borders Bortianor and Tuba-down settlements to the south, Mataheko to the north and Broadcasting area to the east. This community consists of both high-rise and single storey upper and middle class residential developments. The neighbourhood has a very good road network (not tarred) linking various buildings, good physical housing characteristics and gated houses, green open environment and good sanitation as drains where provided for both human affluent and run-off waters (see Figure 3-2 and Table 3-2). Therefore, today most of the upper and middle-income group of residents are living in this community causing some poor people to leave for elsewhere. Some of the gated estates in this community include Red Roof, Iron city, Blue gate, Adom estates etc (see Figure 4-2 (a-b-d)).

Mataheko community

Mataheko community emerged as a result of encroachment on government farmlands and the boundaries of the Weija dam by some developers before government released the farmlands to the community chiefs. A key informant argued that a couple of settlers in this location were already living there before the land

was returned to the traditional authorities (chiefs) of the community. Hence most of the residential developments are largely slum-like with dots of middle class residential units caused by unavailability of land in Accra city, which forces some of these middle class persons to evict lands occupied by slum dwellers to develop through purchase. The community is located in the northern part of Kasoa town. It is bordered to the south by Tuba community, to the east by Weija dam and to the west by Galilea Community. The community has a poor road network, poor physical housing conditions (majority of the buildings), less green spaces and poor sanitation conditions or drainage system (see Figure 3-3 and Table 3-2).

4.5 Characteristics of Tuba and Mataheko communities

This section of this study briefly looks at the general characteristics of the communities under study based on primary and secondary data.

Gender, age and education

The author examined the gender, age and education level attained by respondents for this study from primary and available secondary data at the national level. The majority of the residents in the two peri-urban communities are males, representing over 50%, as per the census data from the Ghana Statistical Service and the primary data confirms the trend. This outcome of the gender of the respondents is the opposite for the whole city of Accra, where over 50% are rather female according to figures from the Ghana Statistical Services. The primary data results show that majority of the respondents are over 40 years old, and a smaller share is in the age group between 18 and 40 years. The results of the primary data show interesting trends as both the richer and poorer areas scored the same percentage of respondents with the highest education level of postgraduate being the same. The poorer area had majority of respondents with primary school education level and the richer area with majority of them being secondary school and first degree holders.

4.6 Spatial and socio-economic dynamics with road expansion in peri-urban communities

This section of this study focused on the spatial and socio-economic dynamics which emerged in the peri-urban communities due to the road expansion. All these findings are based on the key informant interviews conducted in the field together with field observations and visual interpretation of aerial images from Google Earth for physical changes.

4.6.1 Spatial dynamics in Tuba and Mataheko communities

The spatial dynamics which emerged in the peri-urban communities due to the road expansion from informants include the following: high degree of residential development, conversion of land uses, informal developments and change in access to services.

One major spatial dynamic which emerged after the road expansion in Tuba and Mataheko communities was the mad rush of people who bought lands from chiefs earlier on and had not developed them to start doing so in order to stay in Kasoa as a dormitory town and rather drive to work in Accra, especially the middle class after the road expansion. More so, new builders like real estate developers also moved into Kasoa to develop residential units for both sale and renting because the road had opened it up to the city of Accra. One of the informants had expressed that:

> *"People were coming to Kasoa to buy land but they were not developing them because they didn't see the need to come and build and later they will be hustling to come. Even if just a few people who were giving the benefit of the doubt who were just risking to buy land in Kasoa. But a few years ago when this road got expanded we saw a number of people who quickly ran into Kasoa to have a house for themselves simply because there is accessibility. They can easily link up with Accra and come back freely"—Key informant 3.*

Most people were driven to move into Kasoa to start building on their plots of land they bought earlier there immediately after the Accra-Kasoa road was expanded into 4-lanes, because they felt that they could easily move into Accra central and come back freely, without the loss of man's hours in traffic.

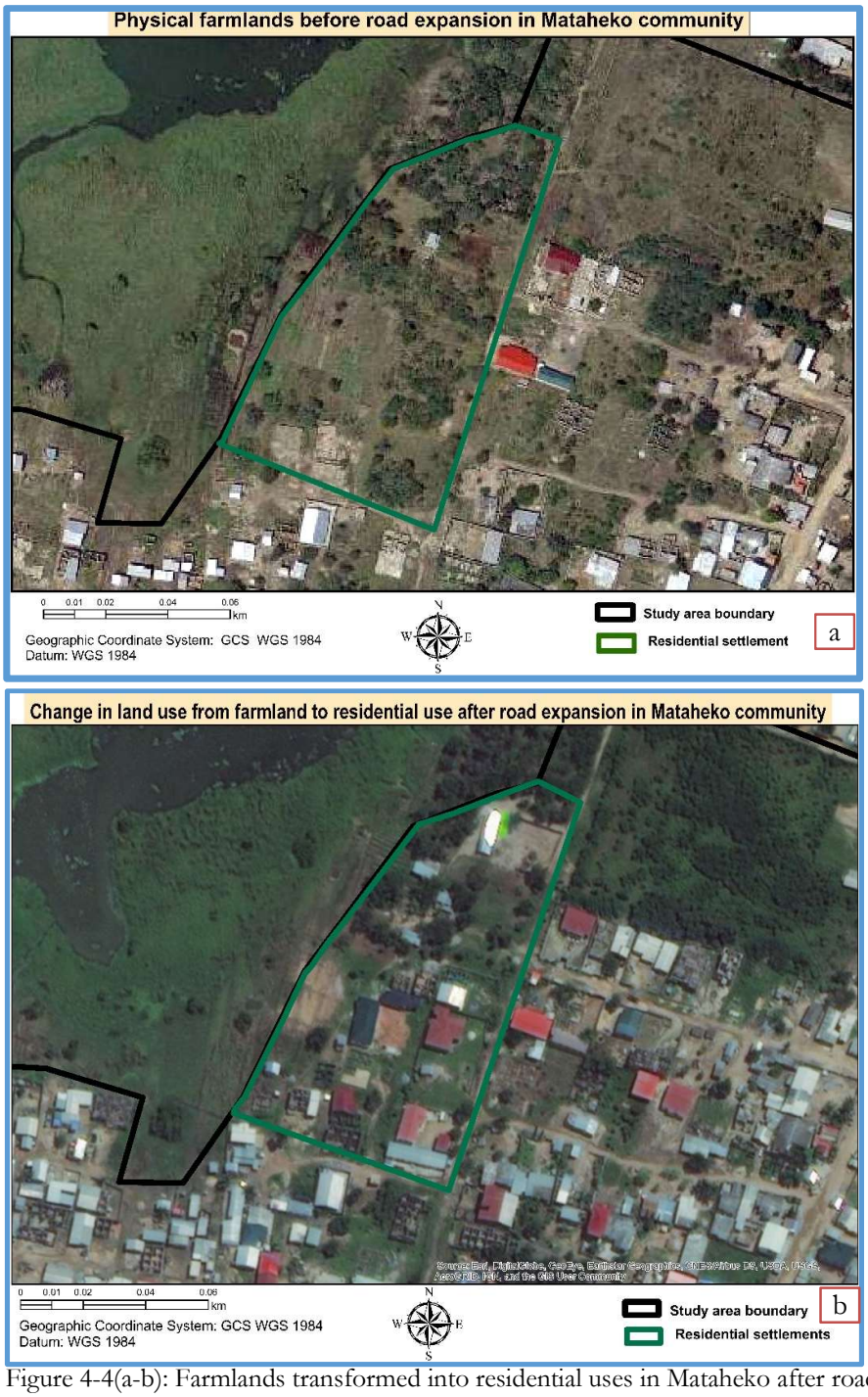

Figure 4-4(a-b): Farmlands transformed into residential uses in Mataheko after road expansion (*Source: Google Earth, 2008 and 2018*)

Figure 4(a) shows a stretch of farmlands in Mataheko community before the road expansion and Figure 4-4(b) shows those same farmlands after the road expansion now being converted into residential uses.

Again, one spatial dynamic which has occurred in the communities due to road expansion is the conversion of land uses. Findings from key informants reveal that agricultural lands had been converted into residential and commercial uses (see Figure 4-4(a-b)). Residential uses were also being converted into commercial uses. This is more particularly with plots of land at the shoulders of the road which were farmlands have become commercial. A key informant expressed that:

> *"Also in times of road development in communities like Kasoa, leads to changes in land values, that is land values increase, especially those lands which are immediately close to the road. Such lands receive mass transformation and are usually turned into shops, stores etc by investors. Commercial activities consume residential uses as investors purchase lands close to road to put into commercial/ income ventures like filling stations etc"—Key informant 5.*

Field observation revealed that most of the properties abutting the road were converted into commercial ones such as fuel stations, shops and stalls selling products ranging from building materials to groceries inter alia. Some residential properties which were close to the road before its expansion had been rebuilt into commercial ones (Figures 4-3 (a-b) and 4-5 (a-b)).

Another spatial dynamic which came up in the communities due to the road expansion is the emergence of informal developments and gated communities in certain parts of Kasoa due to the customary land tenure system, which allows chiefs to control physical planning of communities to the exclusion of statutory planning institutions (Appendix 6). This was however worsened by the mad rush for land for development purposes after the road expansion. This is typified in the Mataheko community where the housing and road layouts are in a very poor state as shown in Figure 4-1(a-b).

It was also inferred from the key informants and FGDs that there was a change in access to services within Tuba and Mataheko communities following the expansion of the road. The road expansion improved to some extent the level of access to amenities like water, electricity, public transport into the communities as it brought some services to the doorsteps of inhabitants. For example, Tuba community saw the laying of water pipelines in its environs as part of the road expansion project by government, before then inhabitants were relying on water tanker services from Accra city centre. A Key informant said: *"Road expansion like that of Kasoa own made communities along there to have some basic amenities that they were not having before. For example, that road expansion came with 20 boreholes that were put as part of it for some communities along it"*. This presupposes that the road expansion project brought a relief to the residents of the two communities regarding the access to potable water as boreholes were sunk and water pipes laid in them by government as part of the project.

Figure 4- 5(a-b): Fuel stations at Mataheko (a) and Car sales yard (b) at Tuba
(*Source: Adugbila's fieldwork, 2018*)

Figure 4-5(a) shows some facilities in a form of fuel stations and Figure 4-5(b) shows car sales yard along the road. Figure 4-3(a) shows vacant plots before the road expansion and Figure 4-3(b) shows those vacant plots with improvements thereon, that is after the road expansion (see Figure 4-3 (a-b)).

4.6.2 Socio-economic dynamics in Tuba and Mataheko communities

Roads serve as a means of enhancing socio-economic needs of society by providing access to services such as schools, health facilities, jobs, market centres among others (Pradhan et. al, 2013; Gibson & Rozelle, 2003). But road development also has the potential of leading to negative socio-economic changes in communities (Wiegand et al., 2017). In the case of Kasoa, this present study shows that both positive and negative socio-economic dynamics came up with its road expansion. In the first place, land values were said to have increased especially for those parcels which were close to the road and which led to the transformation of those parcels of land into shops, stores and filling stations by investors. After the road expansion, the communities in Kasoa saw the building of more social amenity facilities and this led to an improvement in access to social services such as schools, health facilities/clinics, and transport services. Many other services came into the communities immediately after the road expansion to meet the needs of residents.

Employment opportunities were mentioned to have come to the communities along the Accra-Kasoa road after its expansion in 2008. Thus women in the communities along the road had engaged in the preparation of food to sell to construction workers and after the completion of the road project some of them have expanded their businesses and are gainfully earning income to feed themselves and their families. Also, the springing up of commercial activities such as fuel stations, shops, and stores, provide some people within the communities some avenues to engage in employable activities to earn income for a living. A key informant said:

> "*For instance, during road construction, workers working on the road expansion will need food to eat and therefore, women in such areas prepared food to sell to these road workers. This creates economic opportunities for such women and their families as they earn income to take care of their families. Social changes also come out with road expansion like immediate employment opportunities like masonry, artisanship, food vendors. This covers a lot of livelihoods as persons are engaged in active ventures to get income for themselves and their families" – Key informant 5*.

There were both direct and indirect employment opportunities created by the road expansion in Kasoa communities along its stretch. For instance, some of the artisans living in the communities were engaged in the road expansion activities and women also earned income by selling food to the road construction workers at the time.

An interview with the Physical City Planner of Kasoa points out that the essence of physical planning or planning scheme is to have a good road network within communities. The Physical City planner also stressed that road networks ensure free movement of goods and services, security and orderliness within environment of settlements. In Kasoa, according to the key informants, there is facilitation of movement of goods and services and security within most settlements due to the expansion of road network, as travel times in and out of the town is cut down.

The road expansion has improved accessibility into and out of Kasoa and this has made the upper and middle-income people who can afford to drive to stay in the peri-urban zone to enjoy serene environment and isolate from the urban noise to do so. This has gone a long way to affect the social structure in communities to a certain degree as the rich displace the poor in certain localities. This can be visualized in the level of spatial inequalities between Tuba and Mataheko. Tuba has more gated estates which the rich tend to live in and the Mataheko community with tattered houses where the poor tend to reside. A key informant commented that: *"The point is this, the transport system has changed the urban form because it has attracted a particular group of people to go there, but they have gone there and they have actually mixed the local, not mixed in terms of*

their sharing space, they are living in their quarters but the town is being habited by the migrant communities"—Key informant 1. There is some level of spatial separation of housing between the rich and middle-income persons and those of the low-income persons. Thus the rich and middle-income persons live in quarters and the low-income persons live in the crowded places within the central part of Kasoa.

4.7 Variations in spatial and socio-economic dynamics in Tuba and Mataheko communities

This section of this research identifies and explains the variations of spatial and socio-economic dynamics which emerged across the two peri-urban communities before and after the road expansion. These variations were obtained through both primary and secondary data in a form of FGDs and observations from Google Earth respectively.

4.7.1 Spatial dynamics across Tuba and Mataheko communities

Tuba community

In this community, the spatial dynamic which occurred is that there was a relocation of its "Tilapia" market to a new location. The former market which was noted for its tilapia business had been taken to different area towards Kasoa central to make way for people who sell other products such as household products, building materials, groceries in shops and kiosks. Figure 4-6(a) shows some of the traders were still seen close to the tollbooth sitting and hawking and Figure 4-6(b) displays traders carrying and sitting on the shoulders of the road selling to travellers because trading there was more vibrant than in their new market place, which is far away from many residents.

Figure 4- 6(a-b): Some traders at the roadside selling their products (*Source: Adugbila's fieldwork, 2018*)

Mataheko community

In this community, the spatial dynamic which took place after the road expansion is that fuel stations sprung up in it along the road which boosts some trading activities at the shoulder of the road as well. Thus buildings which were being used as residential properties along the road, were now converted into fuel stations to serve the myriad of vehicles plying on the road between the Greater Accra and Central regions. Figure 4-3(a-b) shows some of the fuel stations and other commercial properties which sprung up in this area. Figure 4-3(a) also shows a clustered settlements which were demolished and a fuel station and stores erected in their place as shown in Figure 4-3(b).

4.7.2 Socio-economic dynamics across Tuba and Mataheko communities

Tuba community

The socio-economic dynamics which happened in this community after the road expansion included the following discussed here. Middle-income people moved into this community and displaced the low-income residents. This process led to gentrification in the community as the middle-income class came to live in

Tuba because accessibility to the community has improved and that has caused cost of living to rise. Therefore, some residents with low-income who could not cope with living conditions in the community decided to sell off their houses to persons with income and relocate into other interior parts in Kasoa. In the FGDs at Tuba, a member said: "*Because rich class of people have moved into our community after the road construction. People who were staying here before and realized they could not cope with the high cost of living because of their income levels, left to stay in other areas far away. Some sold out their houses and left for other communities inside. It is not easy here now, prices of things have gone up" – Member 2.* A section of residents with low-income status were adversely affected by the road expansion project in Kasoa due to the influx of a group of people with high income who made to move into other interior parts to high cost of living in a form of rent and prices of products.

This community experienced an increase in crime levels after the road construction though not the same as compared with Mataheko community. This may be due to the more gated estates in Tuba which provides some sort of security controls in comparison with Mataheko community where gating has just started to emerge. After the road expansion, this community experiences crimes like "pick-pocketing[4]" or "419"[5] activities due to the presence of rich people unlike Mataheko where criminals snatch bags. Social activities like asking for help and interactions amongst residents took a tumble as more rich people moved into the community. Some of the poor who could ask for help from neighbours left the community because of high cost of living created by the presence of the rich.

Mataheko community

The socio-economic dynamics which were transpired in this community include the following. During the FGD, some residents mentioned that they experienced increase in crime levels and from day to day people have their belongings snatched by criminals on motorbikes especially women. A member of a FGD expressed that: "*Women in this community had the bags snatched by criminals on motor bikes after the road expansion but before the road expansion this was not present in our community like that. Before the expansion of the road, these kind of things were not present in this town" – Member 4.* Crime rate in the Mataheko community is on the increase and women are not safe in the area as they have their belongings being snatched by criminals on motor bikes after the road was expanded, because the road provides them an escape route.

In addition, social interaction amongst residents in this community was noticed to be on the decline due to the springing up of middle class residential development with gates replacing non-gated and compound types of houses. People now live more secluded lifestyles than before. In the FGD, one member said that: "*Before the road was expanded we could organize outdoor games like football games with other communities and we play together and go our various ways without any troubles. After this road expansion, all the residential buildings are self-contained types which keep households from interacting easily with one another as it was the case before the expansion with the predominantly compound type[6] of buildings" –Member 2.* Residents in the community now live a more indoor lifestyle owing to the emergence of the gated houses in the form of self-contained properties affecting the interactions amongst residents in the community unlike before the road expansion. The influx of gating in the community may limit societal interactions.

[4] Pick-pocketing refers to a crime where thieves stealthily take money or valuables from pockets of unsuspected people in the street, by tailing them and putting hands into their pockets usually in broad daylight.

[5] 419 activities refer to a local term where people who are fraudsters trick unsuspected people to dupe them of mostly cash or their belongings.

[6] Compound house is a type of multi-building with a common entrance where several households live in different rooms but share the same yard and other sanitary facilities such as bath and toilets.

4.8 Perceptions of residents on domains due to road expansion in Tuba and Mataheko

This dimension of this thesis seeks to understand the perceptions of residents on the indicators of specific domains in between the two communities (see Table 4-1), thus from those residents who lived in the communities for the last 10 years. Residents were asked to give their general overall perceptions about the domain indicators beforehand, and after that were asked to indicate how they perceive the road expansion impacted on the domain indicators within their communities. The key informant interviews and FGDs helped to validate and contextualize the pre-selected domains in the city. The perceptions with regard to the impact of the road expansion on indicators were measured on a 5 point Likert scale as explained in chapter 3 section 3.8. The findings obtained from the analysis of the data are discussed below:

4.8.1 Variations of perceptions of residents on domains in Tuba and Mataheko communities

This section of the thesis identifies and explains the changes in the domains as shown in Table 3-3, which residents perceive to be attributed to the road expansion within the communities. The perception patterns vary individually, collectively as a community as well as across the geodemographic of respondents. To measure the variability, homogeneity and consistency in the perceptions of residents in the two communities, coefficient of variation (CoV) that is in range of 0-100% was used as in Tesfazghi et. al, (2010). In this present study, the CoV is computed as the ratio of standard deviation to the mean multiplied by 100%. The analysis covers nine (9) domain attributes for the richer and poorer community areas as shown in Table 4-1, where a mean score of 1 means a completely better-off and 5 means a completely worst-off of an attribute in both cases of before and after the road expansion. The community with the higher percentage of CoV indicates a higher variability and the community with lesser CoV signifies a lower variability (Tesfazghi et al., 2010).

Table 4-1: Variability of socio-economic, public services and physical infrastructure domain attributes in Tuba and Mataheko

Domain	Attribute[7]		Tuba		Mataheko	
			Before	After	Before	After
Socio-economic	What was/is the **level of crime** in this area **before/after** the widening of the road?	Mean	3.23	2.86	3.49	2.64
		Std. deviation	1.25	1.26	1.07	1.09
		CoV (%)	38.70	44.06	30.66	41.29
	What was/is the level of **cost for accommodation** in this area **before/after** the widening of the road?	Mean	4.01	1.68	4.25	1.62
		Std. deviation	0.72	0.71	0.65	0.80
		CoV (%)	18.00	42.26	15.29	49.28
	Rate **cost of living** in this area **before/after** the widening of the road.	Mean	3.77	2.15	4.02	1.92
		Std. deviation	0.72	0.88	0.76	0.80
		CoV (%)	19.10	40.93	18.91	41.67
Public services	How far did/do you have to travel to reach **public transport services** in this area **before/after** the widening of the road?	Mean	3.05	4.08	3.35	4.24
		Std. deviation	1.05	0.68	0.10	0.72
		CoV (%)	34.43	16.67	2.99	16.98
	How far did/do you have to travel to reach **health facilities** in this area **before/after** the widening of the road?	Mean	2.34	3.52	2.46	4.00
		Std. deviation	0.82	0.98	1.04	0.91
		CoV (%)	35.04	27.84	42.28	22.75
	How far did/do kids have to travel to reach **primary schools** in this area **before/after** the widening of the road?	Mean	2.53	4.16	2.45	4.57
		Std. deviation	0.89	0.82	1.08	0.59
		CoV (%)	35.18	19.71	44.08	12.91
Physical infrastructure	Provision level of **electricity** in this area was/has good/improved **before/after** the widening of the road.	Mean	3.30	1.68	3.37	1.59
		Std. deviation	1.16	0.89	1.19	0.61
		CoV (%)	35.15	52.98	35.31	38.36
	Provision level of **potable water** in this area was/has good/improved **before/after** the widening of the road.	Mean	3.54	1.66	3.65	1.48
		Std. deviation	1.12	0.87	1.14	0.64
		CoV (%)	31.64	52.41	31.23	43.24
	Drainage systems in the area was/has good/improved **before/after** the widening of the road.	Mean	3.67	3.65	3.56	3.36
		Std. deviation	1.21	1.28	1.24	1.30
		CoV (%)	32.97	35.07	34.83	38.69

[7] Likert Scale measurements of attributes : 1= Very high/Strongly agree, 2=High/Agree, 3=Neutral , 4=Low/Disagree and 5=Very low/Strongly disagree

Residents' perception with regard to impact of road expansion on socio-economic domain in Tuba and Mataheko

Both in Tuba and Mataheko residents perceive that socio-economic domain attributes have risen after the road construction. Table 4-1 depicts the perceptions of residents with regard to the impact of road expansion with mean scores and standard deviations on each of the socio-economic attributes such as crime level, cost of accommodation and cost of living. In Mataheko community area, residents perceive a higher increase in all the three attributes than Tuba community after the road expansion as in shown in Table 4.1 and Figure 4-7(a-b). Accommodation cost perceive to rise more than the other attributes in the two communities after the road expansion (Appendices 5), with 87% and 93% for Tuba (Figure 4-7(a)) and Mataheko (Figure 4-7(b)) respectively. This is followed by cost of living with 70% and 83% in Tuba and Mataheko respectively, portraying a rise in living cost in the communities after the road expansion. Surprisingly, residents in Mataheko perceive a higher crime level than Tuba, a richer area after the road expansion. Table 4-1 shows that Mataheko with a mean score of 2.64, which shows a relatively higher crime level than Tuba with 2.68, after the road construction (see Appendix 4).

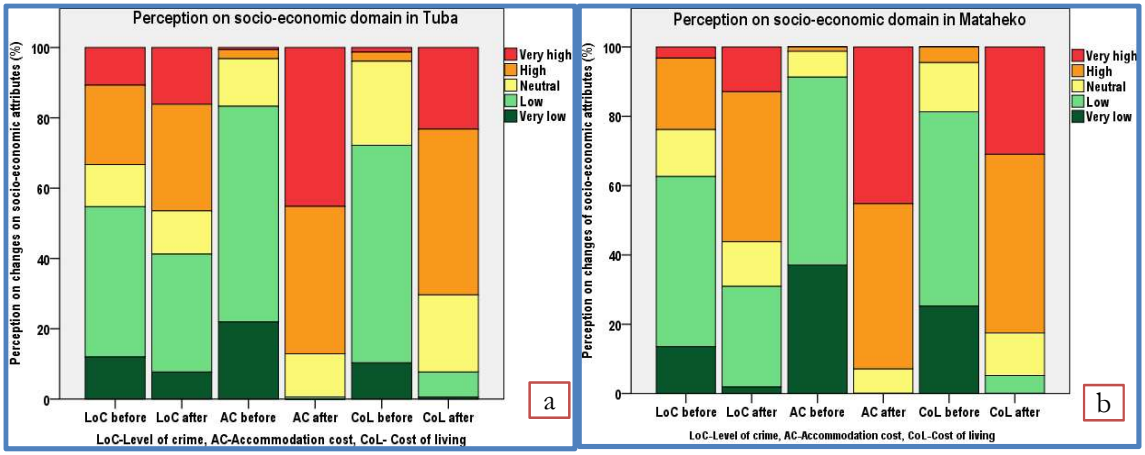

Figure 4- 7(a-b): Residents' perceptions in Tuba (a) and Mataheko (b) on socio-economic domain attributes

It is worth noting that various responses were given by residents in the survey on the state of these socio-economic attributes in their communities. For example, with the increase in crime level within the communities after the road expansion, responses from some residents attributed it to the influx and operation of "okada[8]" business (commercial motorbike transport services) in the area, where criminals take advantage of and use motorbikes to snatch items from people, especially women and this implies such development is not necessarily due to the road expansion. Respondents also emphasized that the rapid urbanization of Accra city has led to a huge demand for accommodation in peri-urban communities as certain high-income rent seekers rushed to peri-urban Accra like Kasoa to stay and that causes accommodation cost to go up. Also, the influx of foreign nationals into the communities caused housing rents to rise as property owners perceive them as high-income people to charge higher rents.

[8] Okada is a local commercial transport system where motorbikes are used to carry people from one location to another for a fee, though not legalized in Ghana.

Residents' perception with regard to impact of road expansion on public service domain attributes in Tuba and Mataheko

In both Tuba and Mataheko residents perceive an improved access to public services after the road was constructed. This domain encompassed public transport, health facilities and primary schools in the communities. In Mataheko, residents perceive a closer access to all the public services than Tuba.

Table 4-1 shows the mean scores and standard deviations and Figure 4-8(a-b) shows the percentage of responses on public services attributes. In this regard, responses in Mataheko (Figure 4-8(b)) perceive a reduction in travel distances to access public transport services and primary schools by kids as compared to Tuba (Figure 4-8(a)) including health facilities after the road widening as shown in Figure 4-8(a-b). For instance, after the road expansion, the mean scores as shown in Table 4-1 show that Mataheko residents perceive a more improved access to all the three public services attributes than Tuba (see Appendices 4 and 5). In the case of access to health facilities in the communities after the road construction, 82% Mataheko residents perceive a closer access to such facilities compared to 62% who perceived similar opinion in Tuba community after the road expansion (see Appendix 5).

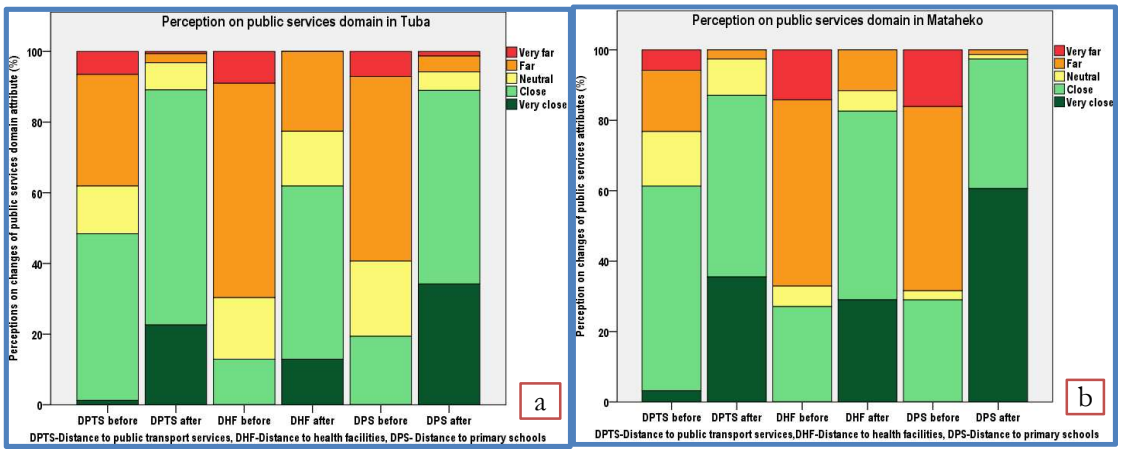

Figure 4- 8(a-b): Residents' perceptions in Tuba (a) and Mataheko (b) on public services domain attributes

However, from the reasons given for the perceptions of residents on how the road expansion affected the public services domain attributes in their communities, some mentioned that the public transport services are closer in the communities because of the establishment of a taxi station and operation of Uber services. For health facilities, they stated reasons like some of the residents who moved into communities after the road construction are health professionals who took advantage of the high demand for medical services due to high population to convert their homes into health centres. Respondents gave reasons why for the improvement in access public services in their communities to include an establishment of a taxi station, operation of "trotro[9]" system and operation of Uber services in the communities, which allowed residents to easily access transport services unlike before 10 years ago. It was noted that some residents in the communities have converted their houses into primary schools to serve the increasing number of primary school going age as the population in their communities is increasing. This has led to a high number of primary schools hence kids no longer have to travel longer distances to schools unlike they do 10 years ago.

[9] Trotro is a public transport system where mini-buses are used to convey travelers from one destination to another within the city, without necessarily stopping at mandatory bus stops. The buses operate with a driver and mate, who collects charges from passengers and notifies the driver where to stop for a passenger to disembark.

Residents' perception with regard to impact of road expansion on physical infrastructure domain attribute in Tuba and Mataheko

Both in Tuba and Mataheko residents perceive that physical infrastructure improved after the road expansion. Table 4-1 shows the mean scores and standard deviations while Figure 4-9(a-b) shows the percentage of responses on physical infrastructure domain attributes in the two communities. What is more revealing from the responses is that less than 5% of the residents disagreed that the road expansion improved potable water and electricity in their communities. With the provision of potable water and electricity in Tuba and Mataheko communities (Figure 4-9(a-b)), 87% and 95% of the responses respectively perceive that had improved after the road expansion, with less than 5% of them not perceive so. After the road expansion, the perception in Mataheko is more positive than the perception in Tuba on improvement of drainage system in the communities as shown in (Figure 4-9(a)). Table 4-1 indicates that in Mataheko residents perceive a more positive on all the three attributes than in Tuba (see Appendix 4).

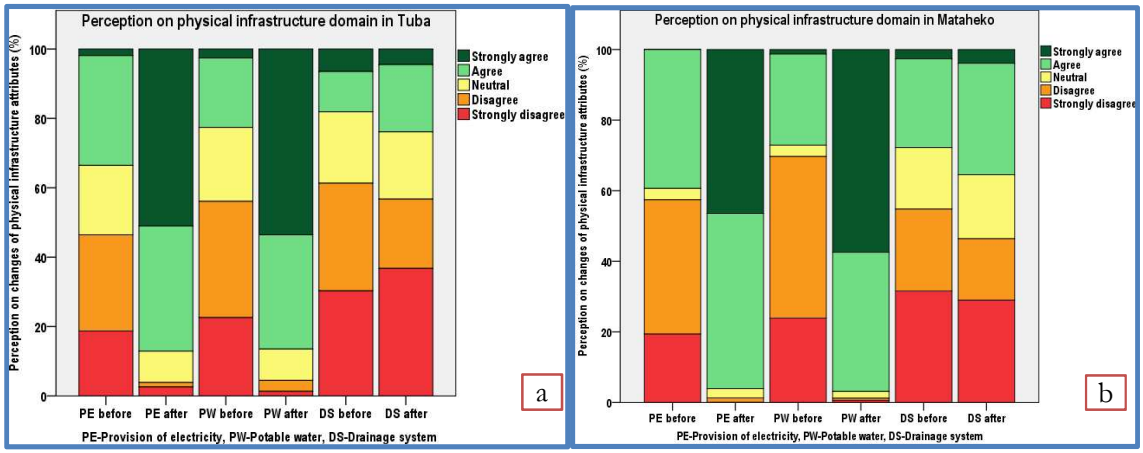

Figure 4- 9(a-b): Residents' perceptions in Tuba (a) and Mataheko (b) on physical infrastructure domain attributes

Regarding the perception of residents on the improvement in the physical infrastructure domain attributes after the road expansion, analysis of the reasons given by respondents surmised that potable water into the communities improved as a result of the road expansion. Some of the respondents in the Tuba area said: *The road expansion made it possible for pipe lines to be laid in the community for residents to access water easily. Water has been supplied to most houses because of the widening of the road which made it possible for laying water pipelines all over the community.* This is in line with one of key informants who mentioned that the road expansion did not only provide communities along the Accra-Kasoa road with 20 boreholes but facilitate the laying of water pipes in there.

However, regarding residents' perception responses on the drainage system in the communities, it was observed that poor layout or improper physical planning was the main reason for no much improvement in the drainage system, especially in Mataheko. Most of the respondents there alluded to the fact that due to poor planning of the area, some residents actually built on waterways which tends to cause flooding in their neigbourhoods. Some responses in Mataheko read: *There is no good drainage system here as a result of poor planning of the community. Drainage system like gutters are not many in the community but major part of the community lack drainage system because of no proper planning.*

For improvement in electricity in the case area, it was noted that the road expansion partly played a role but the major reason for that was due to the rapid physical development in Kasoa communities as a result of the spill over effect from Accra central which made government to extend more electricity infrastructure over there.

4.9 Living conditions due to road expansion in Tuba and Mataheko communities

This part of this present study centres on how residents perceive in Tuba and Mataheko that the road expansion affected their living conditions such as income, job, daily business and daily movement. To measure how the road expansion affected their living conditions of residents in the communities, respondents were asked to give an overall perception on living conditions in general, and after that were asked to rate to what extent they perceive the road expansion has affected their living conditions. For the measurement of the variability, homogeneity and consistency in the perceptions of residents in the communities on living conditions, Coefficient of Variation (CoV) was used also as in Tesfazghi et. al, (2010) (See Table 4-2). Table 4-2 also shows the mean scores of residents' perceptions where 1 means a completely better off and 5 means a completely worst off of an attribute in both cases of before and after the road expansion. Interviews of the key informants and focus groups helped to validate and contextualize the pre-selected variables on a 5 point Likert scale here as in section 4.8. Findings from the data analysis are discussed below.

Table 4-2: Variability of living condition domain attributes in Tuba and Mataheko

Living condition attributes[10]		**Tuba**		**Mataheko**	
What was/is your chance of **getting income** in this area **before/after** the widening of the road?		Before	After	Before	After
	Mean	3.60	2.48	3.33	2.94
	Std. deviation	0.79	0.93	0.99	1.05
	CoV (%)	21.94	37.50	29.72	35.71
What was/is your chance of **getting a job** in this area **before/after** the widening of the road?	Mean	3.64	2.46	3.76	2.83
	Std. deviation	0.75	0.95	0.85	1.10
	CoV (%)	20.60	38.62	22.61	38.87
What was/is the level of your **daily expenses** in this area **before/after** the widening of the road?	Mean	3.56	2.37	3.88	1.97
	Std. deviation	0.76	0.80	0.69	0.74
	CoV (%)	21.35	33.76	17.78	36.56
What was/is the level of your **daily business** activities **before/after** the widening of the road?	Mean	3.47	2.48	3.40	2.80
	Std. deviation	0.82	0.90	0.91	0.92
	CoV (%)	23.63	36.29	26.76	32.86
What was/is the level of your daily movement in this area **before/after** the widening of the road?	Mean	3.33	2.45	3.40	2.53
	Std. deviation	0.83	0.87	0.87	0.89
	CoV (%)	24.92	35.51	25.59	35.18

Residents' perception on how road expansion affected living conditions in Tuba and Mataheko

Both in Tuba and Mataheko residents perceive that the road construction had positively affected living conditions attributes except in daily expenses. Table 4-2 shows the mean scores and standard deviations and Figure 4-10(a-b) shows the percentages of responses on the variables for the measurement of the living conditions of residents. It is interesting that, in Tuba community residents perceive a higher chance of getting income compare to Mataheko community after the road expansion. In Tuba (Figure 4-10(a)), more than half of the responses (54%) perceive the chance of getting income and only 41% of them do so in Mataheko (Figure 4-10(b)). Concerning the chance of getting a job, Table 4-2 shows Tuba residents perceive a higher chance of getting jobs compared to Mataheko after the road expansion with mean scores of 2.46 and 2.83 respectively. Appendix 5 shows that 44% perceive the chance of getting jobs in Mataheko compared to 59% perceiving so in Tuba.

[10] Likert scale measurements for attributes: 1=Very high, 2=High, 3=Neutral, 4=Low, 5=Very low

Also regarding the variation in daily expenses in the communities, 82% of the responses in Mataheko perceive that daily expenses went high compare to 62% in Tuba after the road construction as indicated in Figure 4-10(a-b) and Appendix 5. On the daily business, in Tuba residents perceive a higher daily business as compared to their counterparts in Mataheko, with 58% and 48 % saying so respectively. Finally on daily movement of residents with the road expansion, a higher percentage of the responses in Tuba perceive an increment in their daily movement after the road expansion compared to their counterparts in Mataheko community (see Figure 4-10(b) and Appendix 5).

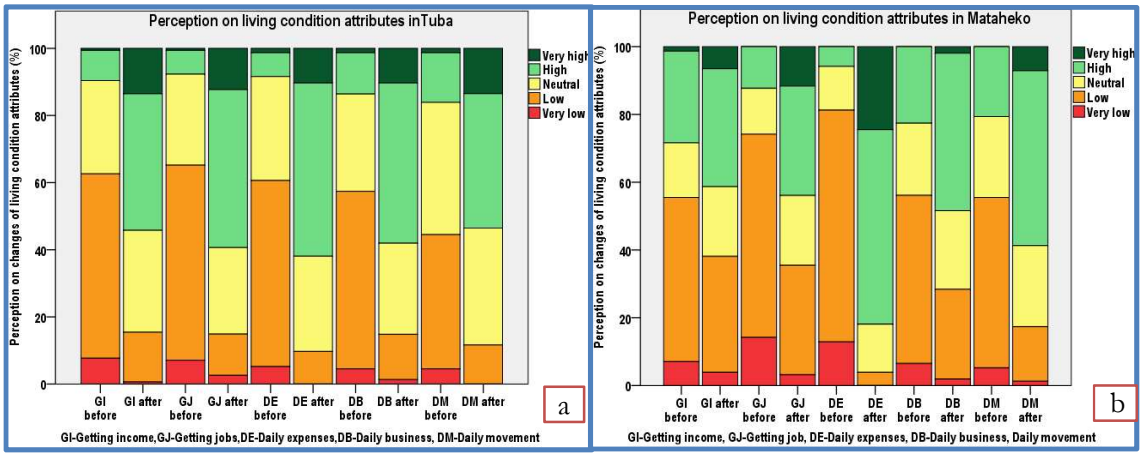

Figure 4- 10(a-b): Residents' perceptions on living condition variables in Tuba (a) and Mataheko (b)

It is important to note here that the analysis of respondents' reasons for their ratings on how they perceive the road expansion affected their living conditions in their communities, different views were expressed accounting for the improvement/increase in all the five attributes. On residents' chances of getting income in the area, some survey responses show that the development of the local economy has allowed them to engage in all sort of economic activities to earn income to take care of their families on daily basis. A respondent in the Mataheko said: *Development of the area has presented to us many income earning options.* However, some also attributed their chances of getting income to the road expansion, as claimed by one respondent in Tuba, who said: *This road expansion has brought a lot of businesses for people to make income and also land owners have been able to make enough because of the increase in prices of land.* Concerning the availability of jobs in the communities with regard to the construction of the road, some respondents emphasized that the chances of getting jobs have rather reduced because of the conversion of farmlands into residential uses, due to demand for land to construct residential properties. Thus those who were earning income before from farming are no longer able to do so after the road expansion, because their pieces of land have been taken and sold out for residential development by chiefs due to high demand for land.

Residents surveyed also expressed the opinions that the daily expenses in their communities increased due to the road expansion for the fact that foodstuff in the market to feed their families have become expensive unlike before when road was not expanded, then they could afford foodstuff at a relatively cheaper prices. They believe the road expansion has made it possible for developers to come into their communities to take up farmlands for residential development to serve potential accommodation seekers. A member of the FGDs in Tuba said: *Before that (road expansion) we used to get food stuff at low prices to buy in the market but now it is expensive, the reason is that all the farmlands have been developed into residential homes with no land for growing any foodstuff here anymore. It is really expensive to living in this place.* It is observed from the responses of residents that the daily movement in the communities has improved because of the road expansion as in the FGDs, where one of the members in Tuba emphasized that: *Before this road was constructed, it was not easy to travel or move around the community and beyond. There were times that people did not want to travel to places when they think about the hustles on the road by then, because it was consuming time to travel out of this place.* This presupposes that people

moving out and in out of the case area actually became better when the road was expanded about 10 years ago due to less traffic time.

4.10 Integration in Tuba and Mataheko communities

This part of this present study aimed to measure the level of the effect on integration in the two communities due to the expansion of the road based on the perceptions of residents. In order to do that, the symbolic, community and functional integration dimensions were analyzed as discussed below.

4.11 Variability of integration in Tuba and Mataheko communities per domain

To measure the variability of integration in the communities, an overall coefficient of variation (CoV) was computed for the three domains on the responses of residents, who were asked to give their overall perceptions on each of the domain variable beforehand and after that to rate how the road expansion affected that. Table 4-3 shows the mean scores, standard deviations and CoV of the symbolic, community and functional integration dimensions and the overall integration of each community based on the perceptions of residents. A high percentage of CoV signifies higher variability and low percentage of CoV indicates lower variability in terms of integration. Analysis in Table 4-3 shows that responses from residents on the three dimensions of integration before the road expansion, Mataheko has lower variability across three dimensions. Table 4-3 shows the mean scores of residents' perceptions on integration where 1 means a completely better-off and 5 means a completely worst-off of an attribute in both cases of before and after the road expansion.

Table 4- 3: Overall integration of dimensions in Tuba and Mataheko

Dimension	**Tuba**		**Mataheko**	
Symbolic integration	Before	After	Before	After
Mean[11] (m)	2.06	2.08	2.70	2.12
Standard deviation	1.01	0.93	1.08	0.96
Coefficient of Variation (%)	49.03	44.71	40.00	45.28
Community integration	Before	After	Before	After
Mean (m)	2.96	2.94	2.80	2.84
Standard deviation	0.95	0.74	1.01	0.99
Coefficient of Variation (%)	32.09	25.17	36.07	34.86
Functional integration	Before	After	Before	After
Mean (m)	3.50	2.33	3.53	2.14
Standard deviation	1.20	1.01	1.19	0.85
Coefficient of Variation (%)	34.29	43.35	33.71	39.72
Overall integration of dimensions	Before	After	Before	After
Mean (m)	2.84	2.45	3.01	2.37
Standard deviation	1.05	0.89	1.09	0.93
Coefficient of Variation (%)	38.47	37.74	36.59	39.95

[11] Mean measurement interpretation: 1= better-off and 5= worst-off

Table 4-4: Overall integration for 310 respondents for Tuba and Mataheko

310 respondents' mean	Before	After
Mean	3.02	2.30
Standard deviation	1.06	0.96
Coefficient of Variation (%)	35.10	42.74

From the standpoint of the mean scores of the two communities based on the residents' perceptions on integration, Tuba residents perceive a higher integrated symbolically either before (m=2.06) or after (m=2.08) the road expansion than Mataheko (see Table 4-3). Mataheko residents perceive a higher community integration also either before (m=2.80) or after (m=2.84) the road expansion than Tuba as shown in Table 4-3 (See Appendix 7). On the functional dimension of integration, Mataheko residents perceive a higher integration (m=2.14) than Tuba community after the expansion of the road. Therefore, on the basis of the total mean scores of all the dimensions of integration, Tuba perceive a higher integration level before the road expansion (m=2.45) than Mataheko. But after the road expansion, Mataheko residents perceive a higher integration level (m=2.37) than Tuba (m=2.45). Interestingly comparing the total mean scores (m) =2.45 and (m) =2.37 of Tuba and Mataheko respectively with the overall mean score of all the three dimension of integration of the 310 respondents (m=2.30) after the road expansion as shown in Table 4-4, signifies a perceive decline in integration in Tuba and Mataheko.

Residents' perception on symbolic integration dimension in Tuba and Mataheko

Both in Tuba and Mataheko residents perceive that symbolic integration attributes improved after the road expansion. Tuba residents perceive a higher symbolically integrated compared to Mataheko after the road expansion. Table 4-5 indicates the percentage of residents' responses on symbolic integration dimension based on sense of pride, sense of belonging and level of friendliness. Therefore, comparing the three attributes of this integration dimension at the community level, the cumulative percentage of respondents expressed that on sense of pride, Mataheko resident perceive a higher percentage of 83% than Tuba with 79% after the expansion, with no response for the not absolutely proud. However, on the sense of belonging, Tuba residents perceive a higher percentage of 69% of the responses felt belonging to their community compared to Mataheko with 62% saying so after the road expansion, with no responses on the not very friendly. Tuba and Mataheko resident perceive the same on level of friendliness, with the percentages, Tuba only improved on this attribute after the road expansion, that is from 54% to 70%. It is also revealed through the cumulative percentages and mean scores that the sense of pride in communities which was perceive the lowest in all the three attributes of the symbolic integration before the road construction, became the highest after the road expansion; then overtaking the other attributes communities. Findings on the averaging of the mean scores as shown in Table 4-3 indicate that, Tuba (m=2.08) has the higher symbolic integration compared to Mataheko (m=2.12) after the road expansion (see Appendix 7).

Table 4-**5:** Percentages of responses on specific indicators of symbolic integration in Tuba and Mataheko

Attributes[12]	**Tuba**				**Mataheko**			
Sense of Pride	Before		After		Before		After	
	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)
Absolutely pride	3	3	41	41	5	5	40	40
Proud	28	31	38	79	37	42	43	83
Neutral	23	54	14	93	8	50	7	90
Not proud	38	92	6	99	45	95	10	100
Not absolutely proud	8	100	1	100	5	100	-	
Mean	**3.19**		**1.86**		**3.10**		**1.85**	
Standard deviation	**1.03**		**0.91**		**1.10**		**0.93**	
Sense of belonging	Before		After		Before		After	
Absolutely belonging	4	4	16	16	5	5	11	11
Belonging	43	47	53	69	40	45	51	62
Neutral	32	79	22	91	23	68	20	82
Not belonging	20	99	8	99	31	99	18	100
Not very belonging	1	100	1	100	1	100	-	
Mean	**2.71**		**2.25**		**2.85**		**2.45**	
Standard deviation	**0.85**		**0.84**		**0.97**		**0.91**	
Level of friendliness	Before		After		Before		After	
Very friendly	33	33	32	32	41	41	38	38
Slightly friendly	21	54	38	70	24	65	32	70
Neutral	25	79	17	87	15	80	18	88
Not friendly	21	100	11	98	20	100	12	100
Not very friendly	-		2	100	-		-	
Mean	**2.35**		**2.14**		**2.15**		**2.04**	
Standard deviation	**1.15**		**1.05**		**1.16**		**1.03**	

Responses from residents as a way of validating and contextualizing their options on, to what extent they perceive the road expansion affected the symbolic integration indicators in the communities over time. The reasons from respondents on the attributes of symbolic integration pointed out that the increase in population due to migration of persons make residents feel to belong to the communities as they are able to make more friends and may confide in them. Some residents mentioned that better roads, street lights and entertainment centres made the community lively and attractive to belong to. Other residents in Tuba also expressed the view that they feel a sense of pride as members of their community because of the serenity nature of the community, which makes people to associate it as a place where rich persons live and that better social amenities are made available in their community due to the road expansion.

Residents' perception on community integration dimension in Tuba and Mataheko

In Both Tuba and Mataheko residents perceive that all the attributes in community integration worsened after the road expansion except interaction within the community. Mataheko residents perceive a higher community integration compared to Tuba after the road expansion (see Table 4-3). To measure this

[12] Likert scale measurements: 1=Absolutely proud/Absolutely belonging/Very friendly, 2=Proud/Belonging/Friendly, 3=Neutral, 4=Not proud/Not belonging/Not friendly and 5=Not absolutely proud/Not absolutely belonging/Not very friendly

dimension of integration, social networks and the level of interactions between friends and families within the environs of community and across other neighbourhoods were examined. Table 4-6 indicates the comparison of the four attributes of this integration dimension in the two communities. What comes out is that amongst all the four variables, asking for help and knowing one another in the communities were perceive to be in the decline after the road expansion as shown in Table 4-6. Also Mataheko residents perceive a decline in its interaction with other neighbourhoods, after the road expansion, its residents perceive interactions with other neighbourhoods at 54% before the road expansion but dropped to 53% after the road expansion, with 46 responses on hardly and 1 response on never. Findings from averaging of the mean scores (see Table 4-6) express that, Mataheko residents perceive a higher community integration compared to Tuba evidenced in the mean scores especially for asking for help among residents within the community, knowing one another and interaction within the community.

Table 4-6: Percentages of responses on specific indicators of community integration in Tuba and Mataheko

Attributes[13]	**Tuba**				**Mataheko**			
Interaction within community	Before		After		Before		After	
	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)
Very well	17	17	18	18	26	26	28	28
Well	19	36	28	46	15	41	19	47
Neutral	46	82	40	86	38	79	41	88
Not well	17	99	12	98	19	98	10	98
Not very well	1	100	2	100	2	100	2	100
Mean	**2.65**		**2.65**		**2.57**		**2.37**	
Standard deviation	**0.98**		**0.10**		**1.13**		**1.06**	
Asking for help in the community	Before		After		Before		After	
Always	3	3	3	3	6	6	4	4
Often	10	13	14	17	18	24	16	20
Sometimes	36	49	30	47	36	60	30	50
Hardly	45	94	47	94	37	97	48	100
Never	6	100	6	100	3	100	2	
Mean	**3.40**		**3.41**		**3.14**		**3.29**	
Standard deviation	**0.87**		**0.89**		**0.95**		**0.90**	
Knowing one another in the community	Before		After		Before		After	
Very well	27	27	20	20	34	34	26	26
Well	22	49	22	42	26	60	25	51
Neutral	36	85	40	82	25	85	29	80
Not well	14	99	17	99	14	99	19	99
Not very well	1	100	1	100	1	100	1	100
Mean	**2.43**		**2.57**		**2.24**		**2.46**	
Standard deviation	**1.08**		**1.02**		**1.10**		**1.12**	

[13] Likert scale measurements of attributes: 1= Very well/Always, 2=Well/Often, 3=Neutral/Sometimes, 4=Not well/Hardly and 5= Not very well/Never

Interacting with other neighbourhoods	Before		After		Before		After	
Always	5	5	3	3	5	5	3	3
Often	7	12	25	28	12	17	18	21
Sometimes	42	54	33	61	37	54	32	53
Hardly	42	96	35	96	45	99	46	99
Never	4	100	4	100	1	100	1	100
Mean	**3.35**		**3.11**		**3.23**		**3.24**	
Standard deviation	**0.86**		**0.94**		**0.87**		**0.88**	

Responses from residents as a way of validating and contextualizing their ratings on how they perceive the road expansion affected the community integration indicators in the communities over time, varied reasons were expressed. The reasons given by respondents in Mataheko for the perceive decline in asking for help and knowing one another included that after the road expansion, people from different culture and rich backgrounds started coming into the community, who mainly live in gated houses which seclude them from other members of the community. This reduced how residents asking for help and knowing one another in the community as it exists before the expansion of the road. Also it was observed that the road expansion helped enhance residents' economic situations as they have jobs to do and they no longer asked for help from others as compared with before. Residents indicate that church, community associations and meetings within the communities allow members to network with other neighbours around. It is during these meeting that members in the communities get to interact and share ideas which allow to know one another and also network as a community. However, some residents reiterated that sports activities which were the grounds for interaction within the community decline after the road expansion and people are busy with their economic activities. This was corroborated in the FGD in Mataheko, where a member mentioned that the community is no longer organize football games between it and other surrounding communities, which promoted interaction amongst residents in Kasoa.

Residents' perception on functional integration dimension Tuba and Mataheko

The purpose of this integration dimension in this present study is to measure access to services like water, electricity and drainage systems in the communities by residents after the road expansion. Both in Tuba and Mataheko residents perceive that the level of functional integration improved after the road expansion. This implies access to services and facilities in the communities improved after the road expansion. Means scores indicate that Mataheko residents perceive a higher better provision of and access to services like electricity, water and drainage systems than their counterparts in Tuba community after the road expansion (see Table 4-7). For example, 97% and 96% of the responses agreed that the provision levels of electricity and water improved in Mataheko compared to 87% each in the case of Tuba respectively.

Table 4-7: Percentages of responses on specific indicators of functional integration in Tuba and Mataheko

Attributes[14]	**Tuba**				**Mataheko**			
	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)
Electricity provision	Before		After		Before		After	
Strongly agree	2	2	51	51	-	-	47	47
Agree	31	33	36	87	39	39	50	97
Neutral	20	53	9	96	3	42	2	99
Disagree	28	81	1	97	38	80	1	100
Strongly disagree	19	100	3	100	20	100	-	
Mean	**3.30**		**1.68**		**3.37**		**1.59**	
Standard deviation	**1.16**		**0.89**		**1.19**		**0.61**	
Water provision	Before		After		Before		After	
Strongly agree	3	3	54	54	1	1	57	57
Agree	20	23	33	87	26	27	39	96
Neutral	21	44	9	96	3	30	2	98
Disagree	34	78	3	99	46	76	1	99
Strongly disagree	22	100	1	100	24	100	1	100
Mean	**3.54**		**1.66**		**3.65**		**1.48**	
Standard deviation	**1.24**		**0.87**		**1.14**		**0.64**	
Drainage system	Before		After		Before		After	
Strongly agree	7	7	5	5	3	3	4	4
Agree	12	19	19	24	25	28	32	36
Neutral	20	39	19	43	17	45	18	54
Disagree	31	70	20	63	23	68	17	71
Strongly disagree	30	100	37	100	32	100	29	100
Mean	**3.67**		**3.65**		**3.56**		**3.36**	
Standard deviation	**1.21**		**1.28**		**1.24**		**1.30**	

Responses from residents in the survey as a way of validating and contextualizing their ratings on how they perceive the road expansion affected functional integration indicators in the communities over time, different reasons were given. The reasons given by respondents in Mataheko community that the road expansion made it possible for the laying water pipelines in the community for residents to access water. However, with provision of electricity it was derived from the analysis that it was more particularly associated with political reasons, that politicians trying to capture support in the communities lobby with government to supply them with electric poles for its electricity connections to certain parts in the case area.

[14] Likert scale measurements of attributes: 1=Strongly agree, 2=Agree, 3=Neutral, 4=Strongly disagree and 5=Strongly disagree

5 DISCUSSION

This chapter of this thesis presents the interpretations of its findings based on the set objectives. This chapter highlights the relationship between changes which emerged in the peri-urban communities with the road expansion to unearth the real impact of the road expansion across the communities under study.

5.1 Local planning and policy, road expansion influence on residential development in Accra

This present study sought to understand the residential development dynamics in peri-urban communities due to road expansion in Accra city. The city of Accra appears to be experiencing a huge residential development over recent decades, especially its peri-urban zones with both spatial and socio-economic dynamics characterizing the urban forms of the communities in a distinct mosaic way. This is in tandem with the preposition by Ravetz et al. (2013) and Simon et al. (2004) that peri-urban towns have become the next destination for residential development in the Global South. In the study of Siiba, Adams, and Cobbinah (2018) in Yendi, Ghana found out that the chieftaincy institution as a custodian of two-third (2/3) of the total land area in the country to some extent impedes, degrades and limits sustainable land use planning for reduction of conversion and encroachment of natural resources and ecosystems, and promotion of sound built environment for urban residents. Findings of this present study showcase that with the arsenal of physical planning frameworks to guide residential development within the Accra city have not yielded the necessary results. This is not only because of lack of enforcement by physical planning authorities but sometimes due to the meddling of the chieftaincy institutions in planning under the cloak of the land tenure system which allows them to exercise absolute power and control over land in communities. This tends to limit, degrade and impede sustainable land use planning and that affects and shapes the growth of the city, as chiefs control development processes (Cobbinah & Korah, 2015).

As noted by Woltjer (2014) in his study that road expansion serves as a vehicle for increase in land consumption mainly for residential development in peri-urban areas because of the influx of active economic population due to easy access to jobs and other opportunities in the major centres. This study found out that the Accra-Kasoa road expansion nearly over a decade attracted a lot of people with economic power, especially the middle-income class to live in peri-urban communities in Kasoa and commute to Accra central for their jobs and other opportunities. This has changed the urban form of the communities around Kasoa and suddenly made it a cosmopolitan community 'overnight' with a huge residential development. The residential development in Kasoa is typified with the emergence of gated estates such as Blue rose estates, Iron city, Red Roof, Adom estates, led by estate developers, with individual developers also rising. This is in line with the studies by Aseidu and Arku (2009) that road improvement has the potential of leading to gating in communities due to the influx of the rich class of individuals. This is perceived to be so, because the expanded road has reduced the travel time to Accra city and back to Kasoa considerably. For instance, before the road expansion, commuters spent over 3-4 man's hours to reach Accra central but within the same pace of distance they now do so in between 15-20 minutes after the road expansion. The reduction in travel time to Kasoa environs from Accra central and beyond due to the road expansion accounted for voluminous residential settlements there as it improved accessibility of residents to a large degree. This was corroborated by members of the FGDs, who expressed similar view as the residents in the survey in the communities in Kasoa.

5.2 Prevailing driving forces and types of residential development in Accra

In the city of Accra, this study found out that the actual driving forces of residential development can be classified into three main domains such as land, infrastructure and opportunity domain drivers. In the first place, on the land domain as a driving force for residential growth in the city, there exists vacant lands in

Accra peri-urban put on wholesale by chiefs for property developers unlike in the inner city. This concurs with the study by Oosterbaan et al. (2012) that the rapid peri-urban growth in Accra is characterized by a complex land market which formalizes customary land tenure arrangements, with traditional chiefs being the primary actors. It is interesting to note that plots available are up to grab by people with different economic status at various locations within Kasoa communities as against with those in Accra central such as East Legon, Kandan, Adabrakwa where land is a preserve for the wealthy class in society. This has increased the demand for residential plots in places like Kasoa, hence massive residential developments emerging in the area over recent years. This land domain driving force is in line with the study of Thuo (2010), which emphasized that outgrowth of residential development in major cities including that of Accra is due to the availability of vacant plots at low cost in its peri-urban neighbourhoods with proximity to job places within the city centre.

In the realm of the infrastructure domain driver, this is in conformity with a discussion by Woltjer (2014) that the greatest driving force of residential development in peri-urban zones is inadequate housing in main cities to meet the demands of citizens and with road infrastructure connecting peri-urban areas to the city centre as the case in Accra city attracts people to peri-urban zones. Similarly in the study of Acheampong and Anokye (2013), the driving force for land conversion into residential use in peri-urban Ghana is mainly due to inadequate urban services. According to Doan and Oduro (2012) peri-urban development tend to linearly follow major roads connecting to the inner city and the rural areas. This is highlighted in the interviews with key informants who opinionated strongly and clearly that roads in peri-urban communities in Accra have driven their residential growth over time. This, therefore, presupposed that road infrastructure and residential development are bed-fellows in any given society whether in the Global South or Global North.

Regarding the opportunity domain as a driving force of residential development in urban peripheries, this study identified over concentration of national opportunities in Accra by successive governments at the expense of other regional capitals and towns in Ghana as a driving factor of the huge residential development in Accra peri-urban over recent years. The over concentration of opportunities tend to naturally cause migration of people from other locations within the country to Accra city with the anticipation of getting their fair share of the national cake in a form of accessing opportunities or jobs. This, therefore, renders Accra peri-urban areas as the fertile ground for residential development to accommodate new entrants into the city, especially those who cannot afford apartments in the city centre. For instance, according to the Ghana Statistical Service Report on Housing and Census 2010, about 78.9% of all investments in the first quarter of 2011 into the country remained in Accra, meaning a huge amount of Ghana's economic potentials are within the capital, Accra. One key informant stated that according to the Accra Metropolitan Assembly, about 80% of all important facilities in Ghana are within Accra urban space, meaning only those who live in Accra stand the chance to benefit from these facilities. Hence the daily influxes of people into the city of Accra to look for such opportunities, making the demand for residential needs to rise and peri-urban communities are at the receiving end of any spillover effect from that.

On the prevailing types of residential development in the city peri-urban, this can be categorized into two types, namely richer and poorer areas distinguished mainly by physical arrangements as in Table 3-2. The richer community area is Tuba, as residents in this community have access to good road networks, available green spaces, and well-layout drains. Residents in this community live in a good physical built environment especially in terms of housing conditions as outlined by UN-Habitat (2002). The class of residents living in this type of residential development include mostly high and middle-income people who mostly live in gated residences and can afford to drive personal cars. On the other hand, the poorer residential area is Mataheko, where the residents do not have access to good road network, face less available green spaces, poor drains and low quality housing conditions. The kind of residents who reside in this residential development consist largely the low-income persons, who depend on public transport in most cases to move around to participate in their activities.

5.3 Prevailing spatial and socio-economic dynamics due the road expansion in Accra

The literature highlights that road development has a significant impact on spatial and socio-economic strata of cities (Knowles, 2006). This study found out that both spatial and socio-economic dynamics which emerged in the peri-urban communities have some link with the road expansion though some were not the direct results of the road expansion. In the context of spatial dynamics, there was a conversion of land uses in the peri-urban communities, where agricultural land turned into residential and commercial uses as in the study of Woltjer (2014) which emphasized that road expansion in peri-urban localities leads to conversion of agricultural land into residential and other complimentary uses. This study also observed that in the two communities, plots at the shoulders of the road were being put into commercial uses such as fuel station, store and stalls, car sales yards, block factories and these developments were confirmed through the FDGs to be a result of the road expansion. This, therefore, has made land in the communities to become very expensive, especially those parcels which are closer to the road. This scenario justifies the analogues by Oosterbaan et al. (2012); Briggs and Mwamfupe (2000) who expressed that road expansion in the peri-urban brings about changes in land uses from agricultural to residential and commercial, with commercial tending to develop linearly along the road. This is because road expansion tends to render such areas no longer as survival zones but as investment zones for entrepreneurial and economic activities as well as services (Briggs and Mwamfupe, 2000).

Secondly, Aseidu and Arku (2009) stressed that road development has the tendency of driving in wealthy people into communities which leads to gating in such areas. This current study also shows that the rising of gating residential development in the communities is not only driven by the influx of the middle-income persons from the city of Accra due to road development but also due to the availability of land in the peri-urban communities. Though the road expansion encouraged this phenomenon to some extent through reduction in travel time to and from the city centre into the Kasoa peri-urban communities from 3-4 hours to about 15-20 minutes but the main reason for the emergence of the middle-income class of persons into the communities leading to gating was due to the availability of cheap land.

In addition, informal developments were noticed to be one of the spatial dynamics which came up in the Mataheko community in Kasoa. According to a key informant, the customary land tenure system made it possible for traditional leaders (chiefs), as custodians of the community land, to have power and control of land and their physical planning in the communities at the expense of the TCPD as a statutory planning body (Siiba et al., 2018). This has led to the growth of slum-like developments in certain parts of the communities particularly in Mataheko community, in a form of poor built environment as show in Figures 4-1 and 4-3(a-b).

The socio-economic dynamics which came up with the road expansion in the peri-urban communities include the following. One of such dynamics is the increase in land values, especially parcels close to the road which has been transformed by investors into commercial uses such as stores and shops, fuel stations. This is in conformity with the assertion by Porter (2011) and Leinbach (2000) that road expansion benefits the rich more, who prefer to own land close to the road due to increase in their values.

Becker (2013) argued in his study just as by Rammelt and Leung (2017) also, that road expansion is normally accompanied by the influx of the rich class into communities, who can afford to live in high quality gated residences in the midst or side by side with the poor. And this has the potential to create social conflict and reduce social interactions between the two classes of persons – where the poor often perceive the rich of enriching their fortunes at their expenses. This phenomenon is more likely a development in the Mataheko community, where the rich started moving into the community and buying built plots belonging to some poor for redevelopment. The next socio-economic dynamic which emerged in the peri-urban communities as a result of the road expansion is in connection with this, which is the perceive decline in social interactions amongst residents of the two communities. This is caused by the influx of middle class residential developments in a form of gated houses which made residents in the communities to live a seclude life unlike before the road expansion. For instance, in the FGD in Mataheko, it was stated that before the road

expansion, residents could organize outdoor games like football with other sisterly communities as a social activity but after the road was expanded this died off. The reason was that the type of houses which started coming up in the communities were predominantly self-contained type of houses with fence walls, which made residents to live more privately, and this limits interactions amongst them to a certain degree.
Besides that, this study found out that there is gentrification occurring in the communities under study after the road expansion. This fits with the findings of Briggs and Mwamfupe (2000) in their study in Tanzania that road expansion in communities led to the displacement of the poor into the hinterland by the rich. This study observed that the road construction which partly attracted the high and middle income persons into the communities served as a ground for the driving away of some low-income residents, who perceive living conditions therein to be very expensive. Interviews of the FGDs indicate that some households sold off their houses and left the community because they could not cope with the current living conditions as the prices of goods and services escalated due to the presence of high income persons after the road expansion.

5.4 Variations of spatial and socio-economic dynamics across in Tuba and Mataheko communities

The communities experienced spatial and socio-economic dynamics across them due to the expansion of the road infrastructure. In the context of spatial dynamics, as in accordance with Briggs and Mwamfupe (2000) land uses change and mainly residential and commercial occur in communities due to road development (Oosterbaan et. al, 2012). The Tuba community saw its "Tilapia" market relocated to another place after the road expansion which rendered it not vibrant and that has forced traders to come onto the shoulders of the road or onto the road near its tollbooth for vending and hawking as in shown Figure 4-6(a-b). In the Mataheko community, there was a springing up of fuel stations replacing residential properties as shown in Figure 4-3 (a-b). Thus residential settlements were converted into fuel stations after the road expansion and this confirmed the argument that commercial uses tend to occur along major roads (Oosterbaan et al., 2012).
In the frame of the socio-economic dynamics, both Tuba and Mataheko communities saw more influx of the high and middle-income people which resulted into their abrupt physical transformations but led to gentrification and a perceive decline in social interactions in the communities as well. This in line with the study by Becker (2013) that road development can limit social interactions, because it drives in rich people who tend to live in quality housing and have nothing to do with the poor. On the other hand, the residents of Mataheko community experienced activities of criminals using motorbikes to snatching belongings of people, especially women while in Tuba "pick-pocketing" was on the increase. The FGD in Mataheko emphasized that with the expansion of the road, criminals in the community had taken advantage to snatch bags of residents, especially women by the use of motor bikes.

5.5 Perceptions of residents on the impact of road expansion in Tuba and Mataheko communities

Residents' perception with regard to impact of road expansion on socio-economic domain

Both in Tuba and Mataheko residents perceive that socio-economic domain attributes have risen after the road construction but Mataheko community residents perceive a higher in all the attributes of the socio-economic domain after the road expansion than Tuba, the richer area. For example, Mataheko residents perceive (with 93% of them) a higher accommodation cost than Tuba community (with 87% of them) after the road expansion (see Appendix 5). Responses on crime level in the two areas show that the poorer area's residents perceive it higher than the richer area, with given reasons like the operation of "okada" business in the communities, which allow criminals to take advantage and snatch belongings of residents mostly women on motorbikes. This ratifies what is in literature that a gated community leads to some level of displacement of crime as it is portrayed in this present study that the residents in the richer area which has

a lot of gated apartments perceive lower level of crime as compared to the poorer area with minimal gating (Landman, 2000).

Residents' perception with regard to impact of road expansion on public services domain

In terms of access to public services, in both Tuba and Mataheko residents perceive an improvement in access to such services. But Mataheko residents perceive a closer access to all the public services such as public transport services, primary schools and health facilities than Tuba after the road expansion. This result disagrees with the findings in Istanbul by Berköz (2009) that indicated that access to educational facilities is one of the major determinants that adversely affects poor and non-gated communities through questionnaire survey to ascertain residents' satisfaction in terms of access to public services. This relates with this present study in the methods to ascertain the perceptions of residents on public services. The reasons given by the residents in this study for the closer access to public services by residents include setting up of a "trotro" system and operations of "okada".

Residents' perception with regard to impact of road expansion on physical infrastructure domain

Both in Tuba and Mataheko residents perceive that physical infrastructure improved after the road expansion but Mataheko residents perceive a more positive improvement in physical infrastructure than Tuba after the road expansion. The survey responses fairly perceive that the drainage systems in the communities improved after the road expansion given reasons like poor physical layout in the communities, which allowed development on waterways. The majority of the responses expressed the view that provision of potable water and electricity in the communities improved as a result of the road expansion. Some respondents reiterated that the laying of water pipelines to most houses was due to the road expansion and that during the road expansion boreholes were drilled to provide the communities with potable water and this was affirmed by one of the key informants and a member of the FGDs.

5.6 Residents' perception on how road expansion affected living conditions in Tuba and Mataheko

Both in Tuba and Mataheko residents perceive that the road construction had positively affected living conditions attributes except in daily expenses, where Mataheko residents perceive higher than Tuba. This implies Mataheko as a poorer area had daily expenses increased more than Tuba as a richer area after the road expansion based on the perceptions of residents in the two communities. As in the studies of Porter (2011) and Leinbach (2000), who noted that road development tends to benefit the rich people more than the poor in society . It is worth noting that, this present study confirmed this assertion as residents in the poorer area perceive a higher increase in their daily expenses than those in the richer area after the road expansion. Also this is notably in the richer area where some of the low-income residents there sold their houses and left them because of increasing living cost. Residents in the richer area rather perceive a higher chance of getting income, jobs and daily business activities after the road expansion than their counterparts in the poorer area. This contradicts the argument by Van De Walle and Cratty (2002) that road expansion raises living conditions of residents in poor neigbourhoods. Additionally, in his study in India, Knowles (2006) stressed that more people from poorer areas tend to move in search for jobs from one place to another in communities after road construction because of ease of travel. In the case of Kasoa, this phenomenon is the same as residents in the poorer community area perceive a higher daily movement in their community than their counterparts in the richer community after the Accra-Kasoa road expansion.

5.7 Integration in Tuba and Mataheko communities

Findings of this study varied in the responses on integration in the communities. Sabatini and Salcedo (2007) stated that integration enables the poor class to access the urban environment to benefit and improve their well-being to integrate symbolically and functionally. This present study confirms this analogue to a certain

degree as residents in poorer area (Mataheko) perceive more integrated functionally than their counterparts in a richer community after road expansion. This current study also contrasts this assertion as residents in the richer community area rather felt more symbolically integrated than their counterparts in the poorer community area after the road expansion.

Residents' perception on symbolic integration dimension in Tuba and Mataheko

Both in Tuba and Mataheko residents perceive that symbolic integration attributes improved after the road expansion but the findings show that Tuba residents perceive a higher symbolic integration than their counterparts in Mataheko community with issues of insecurity after the road expansion (see Table 4-3). These findings agree with results by Nthambi Jimmy (2018) in Nairobi city where residents in slum felt least integrated symbolically due to insecurity. On sense of pride, a higher percentage of the poorer area residents felt proud as members of their community than the richer area after the road expansion gave reasons such as provision of attractive social amenities and the provision of streetlights. Some residents expressed the view that before the road expansion, they were feeling shy telling people that they were members of the communities because they were being laughing at them as people in a bushy town. On sense of belonging amongst residents, the richer area residents felt more belonging as members of the community than those in a poorer area after the road expansion (see Table 4-3). Tuba residents perceive belonging to the community because of the presence of important personalities, serene environment with less criminal activities and beautification of the area with available green spaces. Some of the residents in this community felt belonging to it because of the attractive built environment.

Residents' perception on community integration dimension in Tuba and Mataheko

It is in existing literature that physical barriers and spatial layout isolate residents in gated communities from one another, by creating barriers to social interaction and prevent social networks (Legeby, 2010; Blakely & Snyder, 1997). Findings of this study affirm this scenario, as the poorer community area with a minimal gated settlements perceive a higher community integration than the richer area with a lot of gating after a road widening as evidenced with the mean scores as shown in Table 4-3. On all the attributes of community integration, this study revealed that asking for help and knowing one another in the two communities were perceive to be in the decline after the road expansion given reasons such as gating and availability of income ventures, which allow people to earn income on their own and the presence of people with different cultural backgrounds. Some residents expressed that due to the bad nature of the road before its expansion, people in the community used to offer lifts to other persons in their cars which allow them to interact but after the expansion this phenomenon dropped.

It is also noted that the poorer area residents perceive a decline in its social interactions with other neighbourhoods after the road expansion giving gating in the community as a reason. Despite the presence of activities of church, community associations and meetings in the community as avenues to facilitate its interaction with other neighbourhoods. This validates the analogue by Legeby (2010); Blakely and Snyder (1997) that gating serves as a physical barrier to social interactions and networks in neighbourhoods. A member of the FGDs in Mataheko said: "*Before the road was expanded we could organize outdoor games like football games with other communities and we play together and go our various ways without any troubles. After this road expansion, all the residential buildings are self-contained types which keep households from interacting easily with one another as it was the case before the expansion with the predominantly compound type of buildings" –Member 2.* All these explain how gating in a form of self-contained buildings with fence walls limits interactions amongst residents in communities. A resident in the poorer area also said: "*People move easily now in vehicles and are unable to meet each other. More strangers came in the community due to the road construction and are unable to interact with other people".* This also explains how road expansion limits how individuals interact with their neighbours through change in mobility modes and population size.

Residents' perception on functional integration dimension in Tuba and Mataheko

The degree of accessibility of public services such as electricity, water and so forth constitutes a way of measuring socio-spatial integration in urban set-ups (Ruiz-Tagle, 2013). Functional integration is more with residents having ease access to facilities that allow them enjoy life. Findings of this study indicate that both in Tuba and Mataheko residents perceive that functional integration improved after the road expansion but the poorer area (Mataheko) residents perceive a higher functional integration than the richer area (Tuba) after the road expansion. This confirms the findings by Sabatini and Salcedo (2007) in Latin American, where slum communities benefitted basic services such as water and electricity at the expense of gated communities. In the case area, it is noted that the survey responses indicate that the poorer area received more benefits in terms of services from government than the richer area, mainly for political reasons.

6 CONCLUSION AND RECOMMENDATIONS

The ultimate aim of this study was to understand the residential development dynamics in peri-urban areas due to road expansion, the case of Kasoa in Accra city, Ghana. This research surveyed two communities in Kasoa categorized into richer and poorer areas to draw empirical scenarios for the two areas in the perspective of the impact of the Accra-Kasoa road expansion over a decade ago.

6.1 Residential development dynamics due to road expansion in peri-urban areas in Accra city

The examination of existing local planning and policy instruments regulating residential development within the city of Accra, Ghana provided a solid ground to understand the local residential development dynamics which emerged in the city due to the Accra-Kasoa expansion. The Local Government Act (Act 462) and the Accra 1991 Master Plan which sought to regulate the residential development in the city by stipulating the procedures in erecting residential buildings and defining the boundary of the city's residential development growth respectively, failed to some extent in doing so because of lack enforcement of the Act and the Master Plan. This, therefore, resulted into an escalation in the trends of residential development which leads to certain residential development dynamics within communities in the city. However, this study revealed that the Accra-Kasoa road expansion played a significant role in driving the residential development in and around Kasoa with the upscaling of residential development dynamics with regard to both spatial and socio-economic dimensions. It is noted that the physical planning of the communities under study was being done by chiefs and their contracted surveyors instead of the statutory physical planning unit of the Assembly (TCPD), leaving the TCPD unit to only grant building permits to developers who perhaps submit their buildings designs for its action. This has, therefore, led to the emergence of informal development or slum-like development within certain parts of the communities due to the application of ineffective spatial planning standards.

The road expansion influenced and shaped residential development in the peri-urban communities by opening and linking them to other parts of Accra city and beyond. The road expansion brought about an improvement in accessibility to Kasoa communities and that has attracted people of the upper and middle-income status to move into the communities. For instance, before the expansion of the road, residents in Kasoa spent 3-4 hours to get to Accra central but after the road expansion they do so in about 15-20 minutes. This serves as an attraction for real property developers or individuals to start moving into Kasoa communities to put up residential buildings while travel to the city centre to work and enjoy other opportunities due to the reduction in travel time and traffic by the road expansion. This invariably scaled up demand for land for residential uses as well in the case area.

The prevailing types of residential development in the case area include richer and poorer community areas. The richer community area (Tuba) has a good road network, good drainage system, good sanitation conditions and open green spaces with a high quality housing which serves as dwelling places for the upper and middle-income people (see Figure 3-2). Some poor living in this community before the road expansion left the community and sold off their buildings to live in other interior areas after the road expansion because living cost became so expensive for them because of the influx of rich people. On the other hand, the poorer community area (Mataheko) has a poor road network, poor drainage system, poor sanitation conditions and less green spaces as well as a poor housing quality with a lot of the low-income people living there (see Figure 3-3). However, gentrification occurred in the communities as some rich people came into the area to buy properties occupied by the poor to develop, thereby displacing the poor into the hinterlands. The remnant of this, is the emergence of gating in Mataheko.

The spatial and socio-economic dynamics which came up in the communities following the road expansion are also discussed here in details. In the context of the spatial dynamics, there were conversions of farmlands

into residential and commercial uses after the road expansion which resulted into high demand for land for residential uses due to reduction in travel time from and to the city centre. Plots closer to the shoulders of the road were transformed into commercial uses mainly such as fuel stations, stores and shops, block factory sale points and so forth. This study found out that some social amenities and other services such as potable water, electricity, public transport services perceive to have improved in the communities following the road expansion. For example, 20 boreholes were sunk in the communities as part of the road expansion project to make potable water available to the residents within the catchment area. On the socio-economic dynamic dimensions, one is the increasingly influx of middle-income people into Kasoa communities and which led to gentrification as found by this study as discussed above. Land values also increased due to high demand and not only leading to the transformation of plots close to the road into commercial uses but the displacement of the poor creating a certain spatial inequality owing to gentrification. Employment opportunities came into the area, specifically women who were gainfully earning income during road construction by selling food to road construction workers and after that some sustained such business update as a means of providing for their families. This is confirmed by the interviews with key informants. Additionally, regarding perception of residents on the impact of road expansion, this study found out that the socio-economic domain was perceive to have been the highest adversely affected by the expansion of the road, especially in the poorer area and with public services domain perceive being the least affected.

On the living conditions of residents, daily expenses within the communities was perceive to have been adversely affected by the road expansion hence the migration of the poor away from the communities into other interior areas to avoid hard economic situations created in a form of high prices of foodstuff, rent etc.

Furthermore, the results on the effect of road expansion on integration indicate that there was a perceive decline in integration in general within the communities in Kasoa. However, on the total mean scores at the community levels, the poorer area residents felt more integrated than the richer area. The majority of the residents in the richer area felt more symbolically integrated than the poorer area while the majority of the residents in the poorer area also felt more functionally and community integrated as members of their community than the richer area.

In conclusion, it is evident by this study that the Accra-Kasoa road expansion which happened over a decade ago has resulted into to some residential development dynamics in the peri-urban areas in the city of Accra in both positive and negative. However, there were other auxiliary factors such as the local planning and policy arrangements, availability of land in Accra urban peripheries and concentration of opportunities in the city centre contributed to this phenomenon as discovered by this study. This present study has succeeded to address the gap in literature regarding spatial and socio-economic ramifications in peri-urban areas due to road infrastructure projects in Ghana, which the author identified as missing, hence this research. The result of this study resonates with literature that megaproject infrastructure projects like road expansion tend to transform the socio-spatial landscapes in urban peripheries in the Global South, with changes in land uses and livelihoods with ripple effects on the interface between the urban and the rural settings.

6.2 Limitations and recommendations

This current study sought to understand the residential development dynamics in peri-urban areas due to road expansion in the city of Accra. It is important to take into consideration that the empirical findings are case-specific hence cannot be generalized for all peri-urban areas since such areas generally have different characteristics differentiating them. Therefore, the findings of this study could possibly be aligned with other similar studies to derive logical conclusions.

There is need for further analysis of the impact of road expansion in peri-urban zones at the enumeration unit level to unearth its real impact on households for formulation of people-based and area-based policies.

However, in the context of Ghana, detailed data at such levels are currently not readily available to support such analysis in such zones as encountered by this research. This study, therefore, recommends that detailed census data at the enumeration unit level should be available to enable a reflective analysis by researchers.

6.3 Recommendation for future research

In the literature of Doan and Oduro (2012) points out, there are limited studies on the spatial and socio-economic ramifications in peri-urban zones in the Global South like that of Kasoa in Accra city, Ghana. The findings of this study seeks to serve as a foundation to open more of such studies, not only in the city of Accra but beyond in other similar cities. Further studies in this regard would allow cogent conclusions to be drawn for policy formulation for the city and the country as a whole. Other affiliated research institutions in Ghana could embark on similar studies to unearth the impact of road expansion in communities, especially along the urban peripheries.

The findings of this study also point out a perceive decline in integration and outburst of gentrification in peri-urban Accra, it is important to establish the relationship between road infrastructure projects and community social cohesion in societies in the Global South. It is also evident from this study that not only road expansion leads to residential development dynamics in peri-urban areas but other local factors in a form of local planning and policy arrangements constitute to this as well. This study also recommends comparative studies in different peri-urban areas to know the veracity of that, since such areas tend to have different morphological arrangements.

In the realm of policy recommendations, this study recommends that strategic policies should be put in place by governments in the Global South to protect the land rights in poorer community areas in peri-urban zones against demand forces for land created by the emergence of mega road infrastructure projects by way of simple and affordable land registration processes. This would protect the land rights of the poor against a wantonly unwarranted customary sales of land by traditional authorities in such areas to high-income entities, which can lead to spatial inequalities in their built environments. Compensation packages should be initiated for landholding groups for possible loss of their land in the advent of mega infrastructure projects, so that they can resettle in suitable areas, especially those who are into agricultural activities. Again statutory physical planning authorities should be strengthened with technical and human resources to prepare planning schemes to cover peri-urban areas to forestall any arbitrarily conversion of land uses without regard to physical planning procedures. This would undoubtedly minimize the conversion of agricultural lands into residential uses in the event of mega road projects which has the potential to negatively affect livelihoods or create food security problems in urban peripheries. Finally, before the execution of mega road infrastructure projects, a thorough social impact assessment should be carried out in peri-urban zones to ensure that workable people-based and area-based policies are fashioned to protect the vulnerable affected by such projects. The combination of area-based and people-based policies in a form of establishment of police stations and financial support schemes for people in poorer community areas to protect them from crime and displacement by high and middle-income people as perceive in Kasoa peri-urban communities due to road infrastructure project. This would help contain the social fibre of societies in such zones in the event of mega road infrastructure projects.

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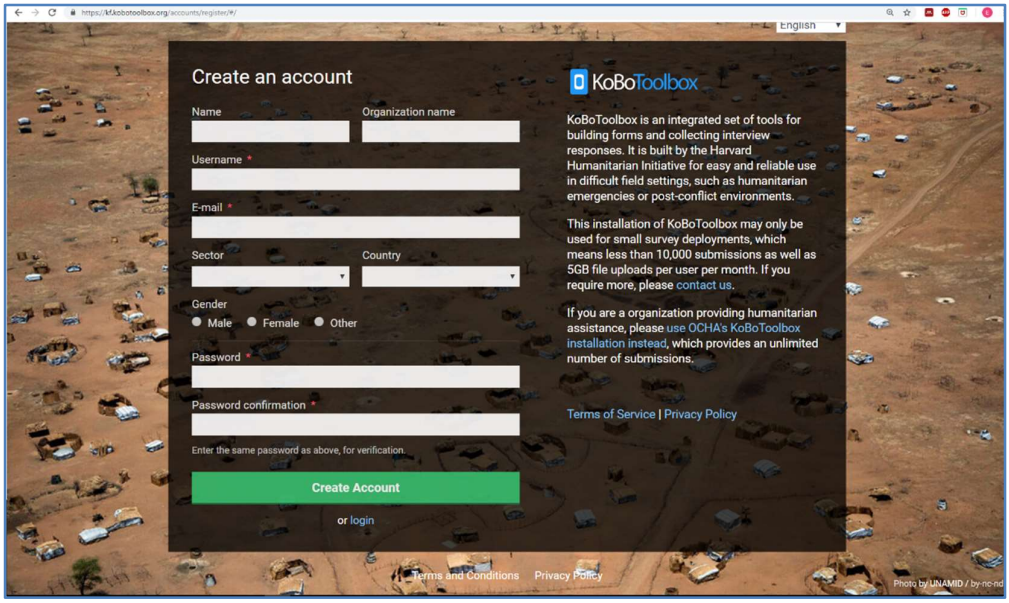
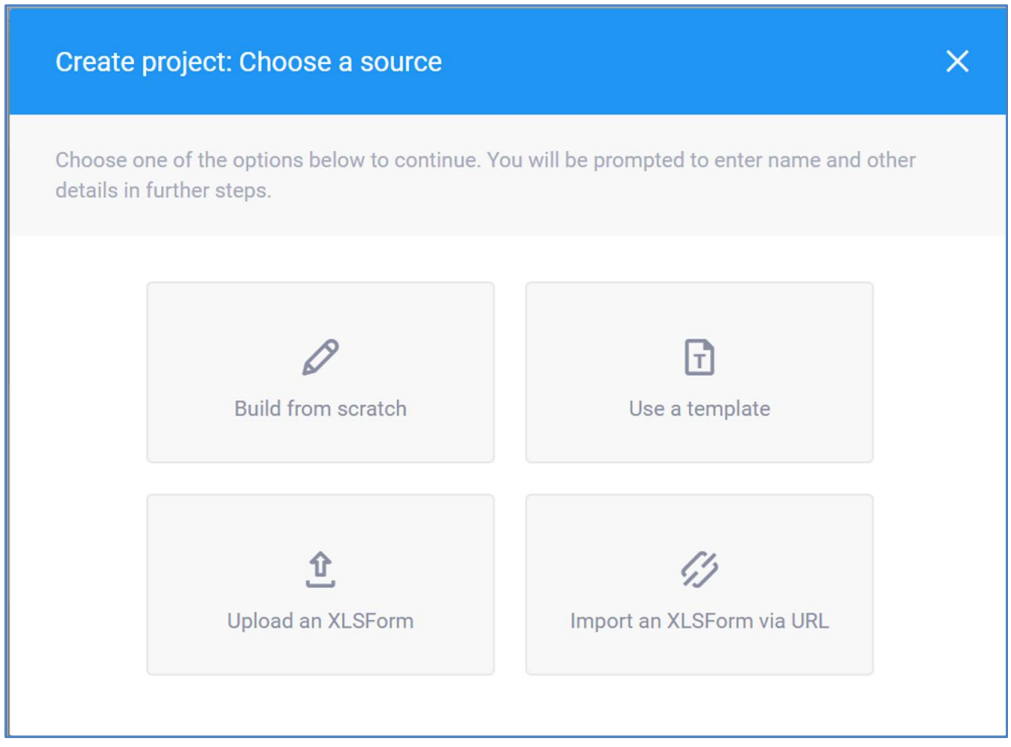
APPENDICES

Appendix 1: Preparation, creation and execution of KoboTool software for data collection in Tuba and Mataheko

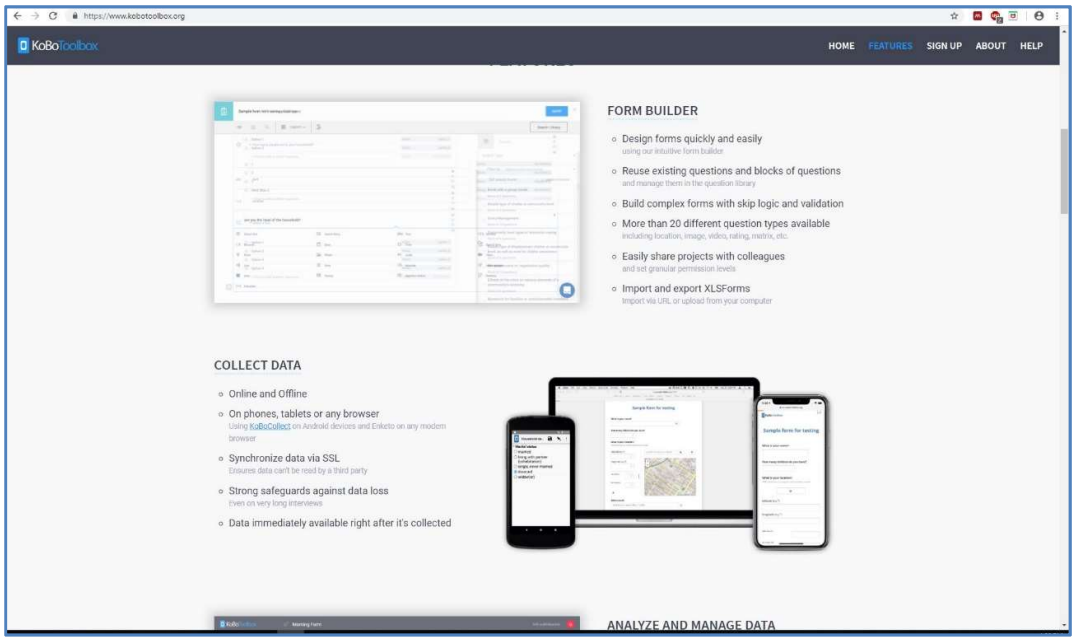
Creating of KoboTool account



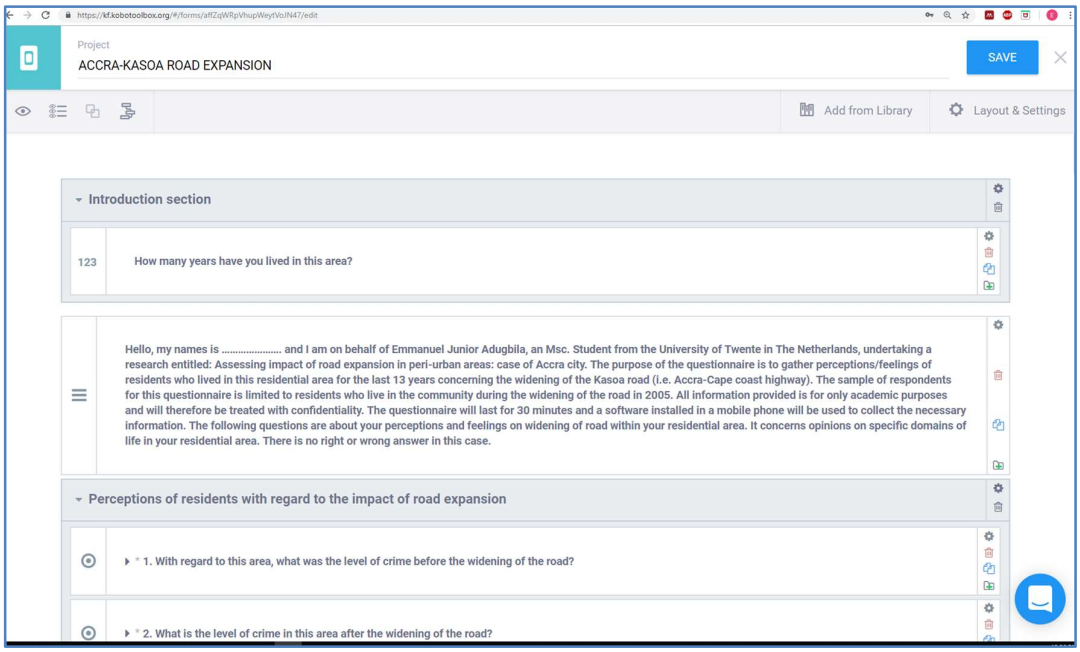
Creating a project in KoboTool Software



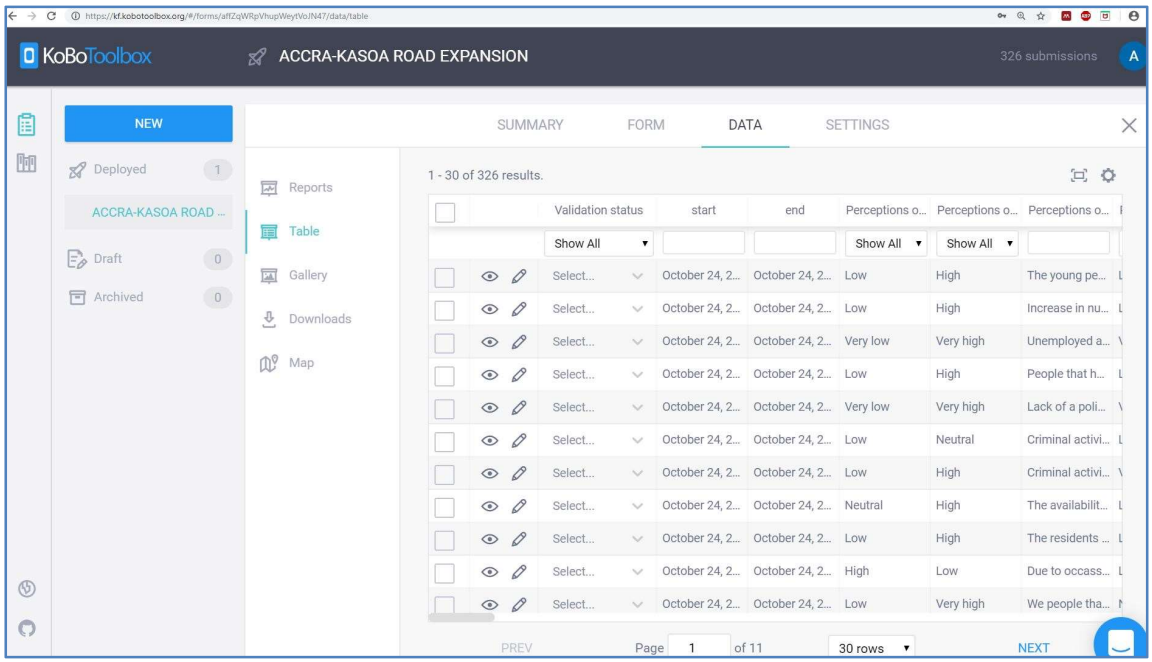
Creation of builder form in KoboTool software after Account creation



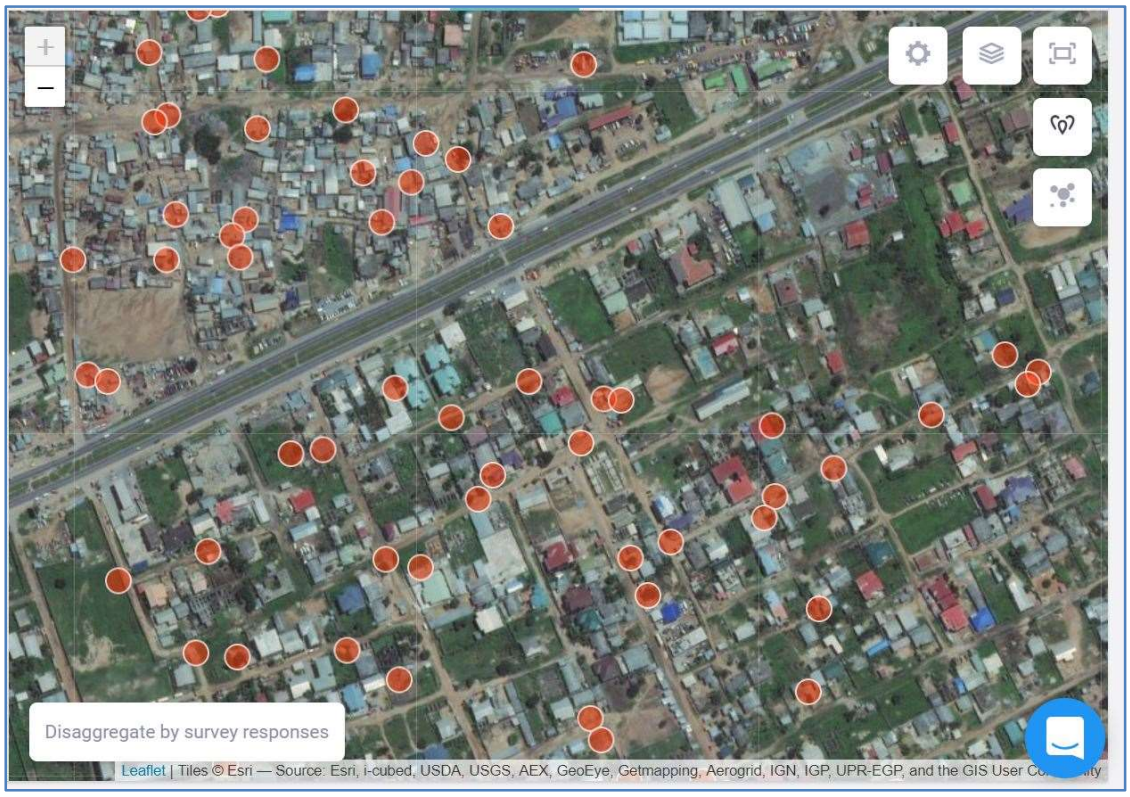
View of form builder after input of questionnaire



Collect multiple sets of geotagged data submitted to the main account



View data of responses using Google Earth at the project site



Appendix 2: Key Informants Interviews guide

Part 1

Introduction

My names is Emmanuel Junior Adugbila, an Msc. Student from the University of Twente in The Netherlands. I am undertaking an Msc research entitled*: Assessing the impact of road expansion in peri-urban areas: case of Kasoa, Accra city*. The purpose of this interview is to gather in-depth information about the impact of road expansion in peri-urban areas in the city of Accra.

Road expansion is the widening of the existing road to increase the number of lanes for vehicular use in order to ease congestion.

This interview will be in three parts. Part 1 is about how local planning and policy influence residential development in the city. Part 2 is on how road expansion influences residential development and part 3 is on the socio-economic dynamics which emerge due to road expansion in peri-urban communities. The interview is entirely for academic purposes and all information provided will therefore be treated with confidentiality and anonymity.

I request for your consent to record this interview with a voice recording device and the entire interview will last for 45 minutes.

Questions for Head of Department, Geography and Resources at University of Ghana.

1. May I know how long have you been in academia?
2. Have you conduct any research into urban infrastructural development projects?
1. Have you undertaken any consultancy in any physical infrastructural development projects?
2. What are your views as a researcher on infrastructural development project in the city?
3. What are your views on road expansion projects in peri-urban communities?
4. As a researcher, can you explain any possible changes which emerge in road expansion like that of Kasoa in 2008?
5. In your views, how did the Kasoa road project shaped and influenced residential development in nearby peri-urban communities.
6. What are the socio-economic dynamics which emerge in nearby peri-urban communities along the Kasoa road expansion?
7. What are the spatial dynamics which emerge in nearby peri-urban communities along the Kasoa road expansion?
8. In your opinion what are the driving factors of residential buildings into peri-urban communities around the city?
9. Do you have any material in a form a maps, articles, photographs, reports to share with me on this Kasoa road expansion?
10. Is there anything you would like to add?

Thank you for your time

Questions for City Planner(s): Ga South and Kasoa Municipal Assemblies

1. May I ask how long have you been working as a city planner?
2. What are the visions of Accra city in terms of its overall planning?
3. Can you share with me the nature of spatial planning framework in the city?
4. Can you share with me the nature of housing policies in the city?
5. Can you share with me the effects of local housing policies in the city?
6. Have you been involved in any physical infrastructural project in the city for the last five year?
7. May I know the kind of project?
8. Can you share your views on the section of the Accra-Cape Coast road expansion which started around 2014?
9. Do you observes changes which came up with the road expansion in peri-urban communities near the road?
10. What were some of the spatial changes which also came up with this road expansion in peri-urban communities near the road?
11. In your opinion as a city engineer and planner, what socio-economic changes came up with this road expansion in peri-urban communities near the road?

12. In your opinion what is driving residential developments in the peri-urban communities around the city and what are their characteristics?
13. What are the types of residential settlements which are emerging in peri-urban communities around the city?
14. What are your experiences with road expansion and residential settlement?
15. In your views, how did the Kasoa road project shape and influence residential development in nearby peri-urban communities.
16. Do you have any material in a form a maps, master plan, development plan, photographs, reports to share with me on the Kasoa road expansion?
17. Is there anything you would like to add?

Thanks for your time

Questions for President, Ghana Real Estate Developers Association (GREDA)

1. May I ask how long have you been working as an Engineer?
2. Can you share with me your views on physical infrastructural projects in the city of Accra for the last five year?
3. Can you share with me your views regarding the section of the Accra-Cape Coast road has expansion work started around 2014?
4. Can you share with me how the road expansion affected peri-urban communities near it?
5. In your opinion as an engineer, what are some of the changes which emerge with road expansion in per-urban communities?
6. What were some of the spatial changes which also came up with this road expansion in peri-urban communities near it?
7. Can you share with me the socio-economic changes which came up with the Accra-Cape Coast road expansion project in peri-urban communities near the road?
8. In your opinion what will you say is the driving force of residential development in the peri-urban communities around the city?
9. Do you think the road expansion has an effect on residential settlement pattern in peri-urban communities around the city? Why?
10. Do you have any material in a form a maps, photographs, reports to share with me on the Kasoa road expansion?
11. Is there anything you would like to add?

Thanks for your time

Questions for Engineer at Ghana Highways Roads

1. May I know how long have you been working as an Engineer in this department?
2. Have you been involved in any physical infrastructural project in the city of Accra for the last five year?
3. May I know the kind of project?
4. Can you share with me your views regarding the Accra-Cape Coast road which expansion work which started around 2014?
5. Can you share with me how the road expansion affected peri-urban communities near it?
6. What were some of the spatial changes which also came up with this road expansion in peri-urban communities?
7. In your opinion as an engineer, what were the socio-economic changes which came up with this road expansion in peri-urban communities near the road?
8. In your opinion what will you say is the driving force of residential buildings in the peri-urban communities around the city?
9. Do you think the road expansion has an effect on residential settlement in peri-urban communities around the city? Why?
10. Do you have any material in a form a maps, photographs, reports to share with me on this Kasoa road expansion?
11. Is there anything you would like to add?

Thank you for your time

Part 2: Interview guide for focus group discussions

Introduction

Hello, my name is ……. and I am moderating the discussion on behalf of Emmanuel Junior Adugbila, an Msc. Student from the University of Twente in The Netherlands, who is undertaking research entitled: *Assessing the impact of road expansion in peri-urban areas: case of Kasoa, Accra city*. The purpose of this focus group discussion is to gather views on variations of spatial and socio-economic changes across peri-urban communities due to road expansion.

Every participant has equal rights to speak out his or her views and each participant is entitled to speak.

The discussion is entirely for academic purposes and all information provided will therefore be treated with confidentiality and anonymity.

Has anybody got any objection(s) to record this interview with a voice recording device and take photographs with a mobile phone? The entire discussion will last for 40 minutes. Any questions before we begin the interview.

Main questions for FGDs

1. How long have you been living in this community?
2. May I ask you to sketch on the map to show the road and where you live in the community?
3. What are your general opinions on road expansion activity in your community?
4. What are the social changes like change in criminal activities you noticed which came up with the road expansion in your community?
5. What are the economic changes like change in cost of living you noticed which came up with the road expansion in your community?
6. What are the physical changes you noticed which came up with the road expansion in your community?
7. How do you feel as residents about these social, economic and physical changes in your community due to the widening of the road?
8. Is there anything you will like to add?

Thank you for your time

Appendix 3: Questionnaire

Introduction

Hello, my names is ……. and I am on behalf of Emmanuel Junior Adugbila, an Msc. Student from the University of Twente in The Netherlands, undertaking a research entitled: *Assessing the impact of road expansion in peri-urban areas: case of Kasoa, Accra city*. The purpose of the questionnaire is to gather perceptions/feelings of residents who lived in this residential area for the last 10 years concerning the widening of the Kasoa road (i.e. Accra-Cape coast highway). The sample of respondents for this questionnaire is limited to residents who live in the community during the widening of the road in 2008.
All information provided is for only academic purposes and will therefore be treated with confidentiality. The questionnaire will last for 30 minutes and a software installed in a mobile phone will be used to collect the necessary information.
The following questions are about your perceptions and feelings on widening of road within your residential area. It concerns opinions on specific domains of life in your residential area. There is no right or wrong answer in this case.

Read: The following questions are about residents' perceptions on widening of road

How many years have you lived in this area? ……..					
Attribute of assessment	**Level of assessment**				
Socio-economic	1	2	3	4	5
1. With regard to this area, what was the level of crime **before** the widening of the road?	Very high	High	Neutral	Low	Very low
2. What is the level of crime in this area **after** the widening of the road?	Very high	High	Neutral	Low	Very low
Explain your choice in questions 1 and 2 with regard to the road widening.					
3. With regard to this area, what was the level of cost for accommodation in this area **before** the widening of the road?	Very high	High	Neutral	Low	Very low
4. What is the level of cost for accommodation in this area **after** the widening of the road?	Very high	High	Neutral	Low	Very low
Explain your choice in questions 3 and 4 with regard to the road widening.					
5. Rate cost of living in this area **before** the widening of the road.	Very high	High	Neutral	Low	Very low
6. Rate cost of living in this area **after** the widening of the road.	Very high	High	Neutral	Low	Very low
Explain your choice in questions 5 and 6 with regard to the road widening.					
Public Services	1	2	3	4	5
7. How far did you have to travel to reach public transport services in this area **before** the widening of the road?	Very far	Far	Neutral	close	Very close
8. How far do you have to travel to reach public transport services in this area **after** the widening of the road?	Very far	Far	Neutral	Close	Very close
Explain your choice in questions 7 and 8 with regard to the road widening.					

9. How far did you have to travel to reach health facilities in this area **before** the widening of the road?	Very far	Far	Neutral	Close	Very close
10. How far do you have to travel to reach health facilities in this area **after** the widening of the road?	Very far	Far	Neutral	Close	Very close
Explain your choice in questions 9 and 10 with regard to the road widening.					
11. How far did kids have to travel to reach primary schools in this area **before** the widening of the road?	Very far	Far	Neutral	Close	Very close
12. How far do kids have to travel to reach primary schools in this area **after** the widening of the road?	Very far	Far	Neutral	Close	Very close
Explain your choice in questions 11 and 12 with regard to the road widening.					
Physical infrastructure	1	2	3	4	5
13. Provision level of electricity in this area was good **before** the widening of the road.	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
14. Provision of electricity in this area has improved **after** the widening of the road.	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Explain your choice in questions 13 and 14 with regard to the road widening.					
15. Provision level of potable water in this area was good **before** the widening of the road.	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
16. Provision of potable water in this area has improved **after** the widening of the road.	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Explain your choice in questions 15 and 16 with regard to the road widening.					
17. Drainage systems in the area was good **before** the widening of the road.	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
18. In this area, drainage systems have improved **after** the widening of the road.	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Explain your choice in questions 17 and 18 with regard to the road widening.					

Source: Adopted and modified: Nthambi Jimmy (2018)

Read: The following questions are about how widening of road affects living conditions of residents.

Attribute of assessment	**Level of assessment**				
	1	2	3	4	5
19. What was your chance of getting income in this area **before** the widening of the road?	Very high	High	Neutral	Low	Very low
20. What is your chance of getting income in this area **after** the widening of the road?	Very high	High	Neutral	Low	Very low
Explain your choice in questions in 19 and 20 with regard to the road widening.					
21. What was your chance of getting a job in this area **before** the widening of the road?	Very high	High	Neutral	Low	Very low
22. What is your chance of getting a job in this area **after** the widening of the road?	Very High	High	Neutral	Low	Very low
Explain your choice in questions 21 and 22 with regard to the road widening.					
23. What was the level of your daily expenses in this area **before** the widening of the road?	Very high	High	Neutral	Low	Very low
24. What is the level of your daily expenses in this area **after** the widening of the road?	Very high	High	Neutral	Low	Very low
Explain your choice in questions 23 and 24 with regard to the road widening.					
25. What was the level of your daily business activities **before** the widening of the road?	Very high	High	Neutral	Low	Very low
26. What is the level of your daily business activities **after** the widening of the road?	Very high	High	Neutral	Low	Very low
Explain your choice in question 25 and 26 with regard to the road widening.					
27. What was the level of your daily movement in this area **before** the widening of the road?	Very high	High	Neutral	Low	Very low
28. What is the level of your daily movement in this area **after** the widening of the road?	Very high	High	Neutral	Low	Very low
Explain your choice in 27 and 28 with regard to the road widening.					

Read: Please before starting the next set of questions, I would like to tell you briefly about the purpose of the interview. People have different views regarding the level of effect on social integration due to widening of roads in their residential area, as they experience and feel differently about that. It is exactly these views we are interested to know.

Level of effects on social integration due to widening of road

Attribute of assessment	**Level of assessment**				
Symbolic and community integration	1	2	3	4	5
29. With regard to this area, what was the level of your sense of pride **before** the widening of the road?	Absolutely proud	Slightly proud	Neutral	Not proud	Not absolutely proud
30. With regard to this areas, what is your level of sense of pride **after** the widening of the road?	Absolutely proud	Slightly proud	Neutral	Not proud	Not absolutely proud
Explain your choice in questions 29 and 30 with regard to the road widening.					
31. With regard to this area, what was the level of your sense of belonging **before** the widening of the road?	Absolutely belonging	Slightly belonging	Neutral	Not belonging	Not absolutely belonging
32. What is your level of sense of belonging in this area **after** the widening of the road?	Absolutely belonging	Slightly belonging	Neutral	Not belonging	Not absolutely belonging
Explain your choice in questions 31 and 32 with regard to the road widening.					
33. What was the level of friendliness in this area **before** the widening of the road?	Very friendly	Slightly friendly	Neutral	Not friendly	Not very friendly
34. What is the level of friendliness in this area **after** the widening of the road?	Very friendly	Slightly friendly	Neutral	Not friendly	Not very friendly
Explain your choice in questions 33 and 34 with regard to the road widening.					
35. How well did residents interact in this area **before** the widening of the road?	Very well	Well	Fairly	Not well	Not very well
36. How well do residents interact in this area **after** the widening of the road?	Very well	Well	Fairly	Not well	Not very well
Explain your choice in questions 35 and 36 with regard to the road widening.					
37. How regular did residents ask for help from one another **before** the widening of the road?	Always	Often	Sometimes	Hardly	Never
38. How regular do residents ask for help from one another **after** the widening of the road?	Always	Often	Sometimes	Hardly	Never
Explain your choice in questions 37 and 38 with regard to the road widening.					
39. How well did residents know one another in this area **before** the widening of the road?	Very well	Well	Fairly	Not well	Not very well
40. How well do residents know one another in this area **after** the widening of the road?	Very well	Well	Fairly	Not well	Not very well

Explain your choice in questions 39 and 40 with regard to the road widening.					
41. How regular did residents interact with their neighbours in other different areas **before** the widening of the road?	Always	Often	Sometimes	Hardly	Never
42. How regular do residents interact with their neighbours in other different areas **after** the widening of the road?	Always	Often	Sometimes	Hardly	Never
Explain your choice in questions 41 and 42 with regard to the road widening.					

Source: Adopted and modified :Nthambi Jimmy (2018) and Sabatini & Salcedo (2007)

What type of relationship is between you and your other residents if any?

a) Family/Friend b) Business/Professional c) None d) Other specify ……

Respondents' profile

Gender: Man ( ) Woman ( )

May I ask your age? …….

What is your level of education?

a) Primary school
b) Secondary school
c) Post-secondary
d) First degree
e) Postgraduate degree

Source: Ghana Statistical service, 2012

Thank you for your time

Appendix 4: Variations of perceptions of residents on domains in Tuba and Mataheko communities

Mean scores of socio-economic domain attributes in Tuba and Mataheko

		Level of crime before	Level of crime after	Accommodation cost before	Accommodation cost after	Cost of living before	Cost of living after
Tuba	Mean	3.23	2.86	4.01	1.68	3.77	2.15
	Std. dev.	1.25	1.26	0.72	0.71	0.72	0.88
Mataheko	Mean	3.49	2.64	4.25	1.62	4.02	1.92
	Std. dev.	1.07	1.09	0.65	0.62	0.76	0.80

Mean scores of public services domain attributes in Tuba and Mataheko

		Public transp. before	Public transp. after	Health facil. before	Health facil. after	Primary sch. before	Primary sch. after
Tuba	Mean	3.05	4.08	2.34	3.52	2.53	4.16
	Std. dev.	1.05	0.68	0.82	0.98	0.89	0.82
Mataheko	Mean	3.35	4.24	2.46	4.00	2.45	4.57
	Std. dev.	0.10	0.72	1.04	0.91	1.08	0.59

Mean scores of physical infrastructure domain attributes in Tuba and Mataheko

		Provision of electric. before	Provision of electric. after	Potable water before	Potable water after	Drainage system before	Drainage system after
Tuba	Mean	3.30	1.68	3.54	1.66	3.67	3.65
	Std. dev.	1.16	0.89	1.12	0.87	1.21	1.28
Mataheko	Mean	3.37	1.59	3.65	1.48	3.56	3.36
	Std. dev.	1.19	0.61	1.14	0.64	1.24	1.30

Mean scores on living condition attributes in Tuba and Mataheko

		Income before	Income after	Job before	Job after	Expenses before	Expenses after	Business before	Business after	Daily movt before	Daily movt after
Tuba	Mean	3.60	2.48	3.64	2.46	3.56	2.37	3.47	2.48	3.32	2.45
	Std. dev.	0.79	0.93	0.75	0.95	0.76	0.80	0.82	0.90	0.83	0.87
Mataheko	Mean	3.33	2.94	3.76	2.83	3.88	1.97	3.40	2.80	3.40	2.53
	Std. dev.	0.99	1.05	0.85	1.10	0.69	0.74	0.91	0.92	0.87	0.89

Appendix 5: Percentages of responses on domains in Tuba and Mataheko communities

Percentage of responses on socio-economic domain attributes in Tuba and Mataheko

Socio-economic Attributes	**Tuba**				**Mataheko**			
Level of crime	Before		After		Before		After	
	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)
Very High	11	11	16	16	3	3	13	13
High	23	34	30	46	21	24	43	56
Neutral	10	44	12	58	14	38	13	69
Low	44	88	34	92	49	87	29	98
Very low	12	100	8	100	13	100	2	100
Accommodation cost	Before		After		Before		After	
Very High	1	1	45	45	-	-	45	45
High	3	4	42	87	1	1	48	93
Neutral	13	17	12	99	8	9	7	100
Low	61	78	1	100	56	65	-	
Very low	22	100	-		35	100	-	
Cost of living	Before		After		Before		After	
Very High	1	1	23	23	-	-	31	31
High	3	4	47	70	5	5	52	83
Neutral	24	28	22	92	14	19	12	95
Low	62	90	7	99	56	75	5	100
Very low	10	100	1	100	25	100	-	

Percentage of responses on public services domain attributes in Tuba and Mataheko

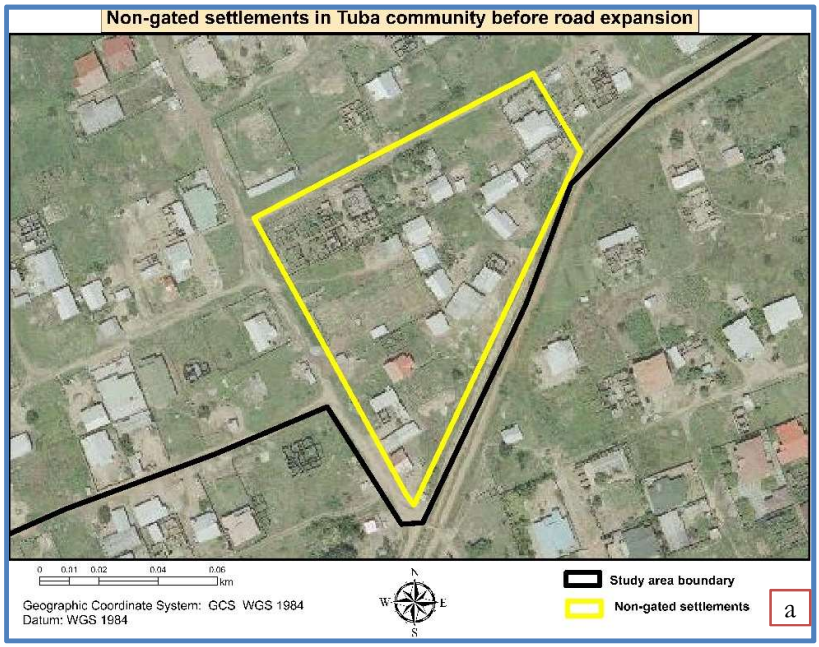
Public services Attributes	**Tuba**				**Mataheko**			
Public transport services	Before		After		Before		After	
	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)
Very far	7	7	1	1	6	6	-	-
Far	32	39	2	3	17	23	3	3
Neutral	13	52	8	11	16	39	10	13
Close	47	99	66	77	58	97	51	64
Very close	1	100	23	100	3	100	36	100
Health facilities	Before		After		Before		After	
Very far	9	9	-	-	14	14	-	-
Far	61	70	23	23	53	67	12	12
Neutral	17	87	15	38	6	73	6	18
Close	13	100	49	87	27	100	53	71
Very close	-		13	100	-		29	100
Primary schools	Before		After		Before		After	
Very far	7	7	1	1	16	16	-	-
Far	52	59	5	6	52	68	1	1
Neutral	21	80	5	11	3	71	1	2
Close	20	100	55	66	29	100	37	39
Very close	-		34	100	-		61	100

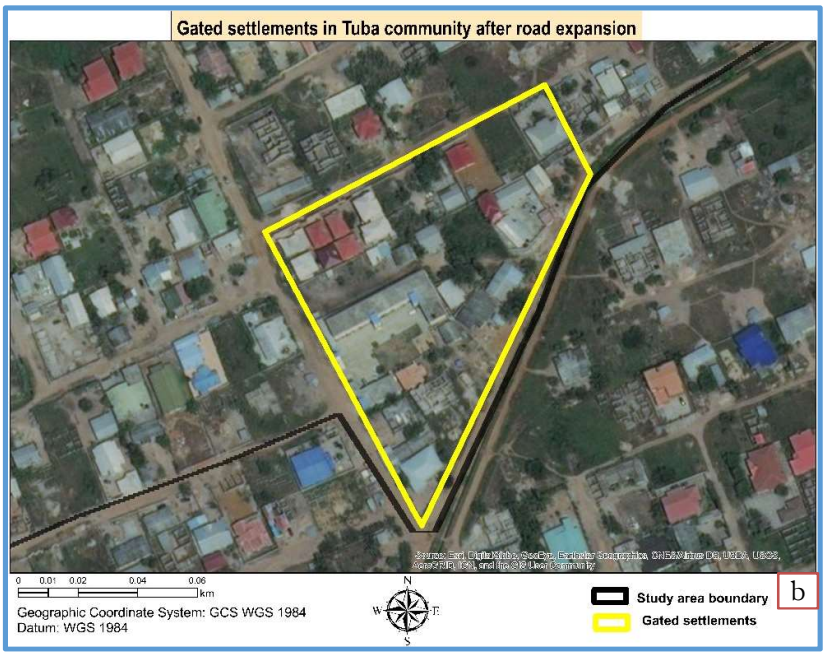
Percentage of responses on physical infrastructure domain attributes in Tuba and Mataheko

Physical infrastructure Attribute	**Tuba**				**Mataheko**			
Provision of electricity	Before		After		Before		After	
	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)	Percent (%)	Cum. (%)
Strongly agree	2	2	51	51	-	-	46	46
Agree	32	34	36	87	39	39	50	96
Neutral	20	54	9	96	3	42	3	99
Disagree	28	82	1	97	38	80	1	100
Strongly disagree	18	100	3	100	20	100	-	
Potable water	Before		After		Before		After	
Strongly agree	3	3	54	54	1	1	57	57
Agree	20	23	33	87	26	27	39	96
Neutral	21	44	9	96	3	30	2	98
Disagree	34	78	3	99	46	76	1	99
Strongly disagree	22	100	1	100	24	100	1	100

Drainage system	Before		After		Before		After	
Strongly agree	7	7	5	5	3	3	4	4
Agree	12	19	19	24	25	28	32	36
Neutral	20	39	19	43	17	45	18	54
Disagree	31	70	20	63	23	68	17	71
Strongly disagree	30	100	37	100	32	100	29	100

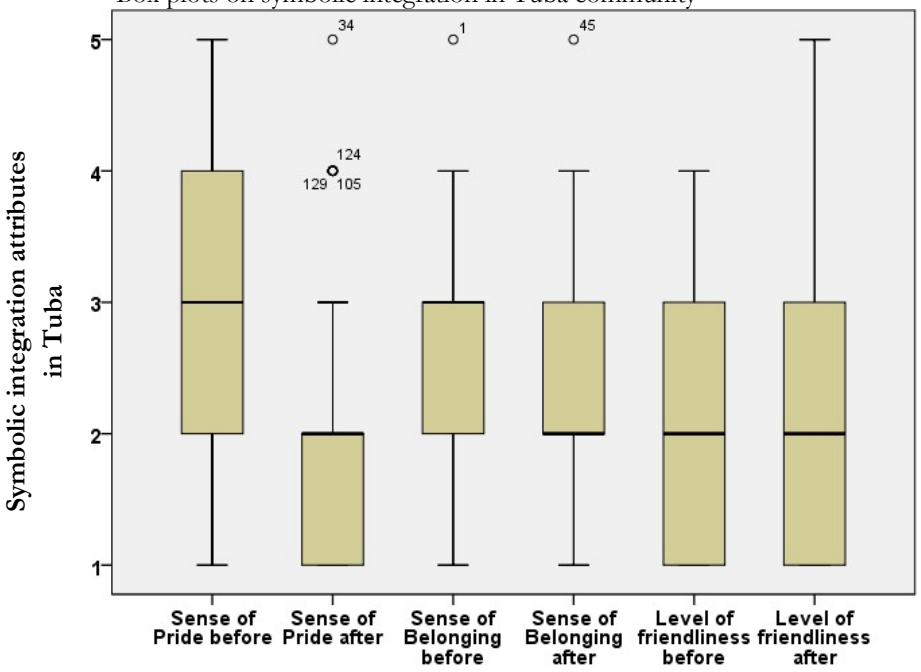
Appendix 6: Emergence of gated estates in Tuba community



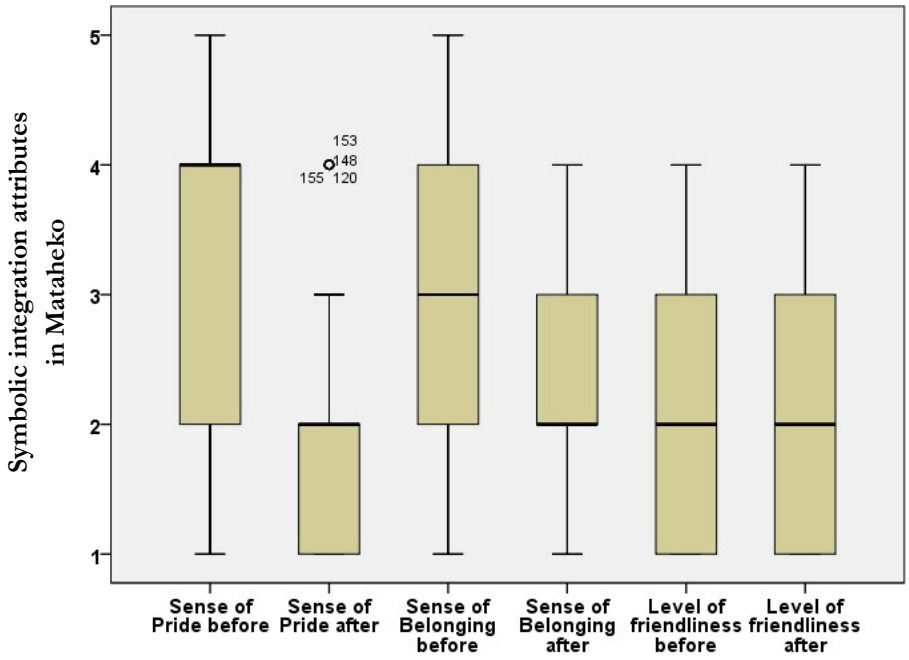


Appendix 7: Box plots on integration domains in Tuba and Mataheko communities

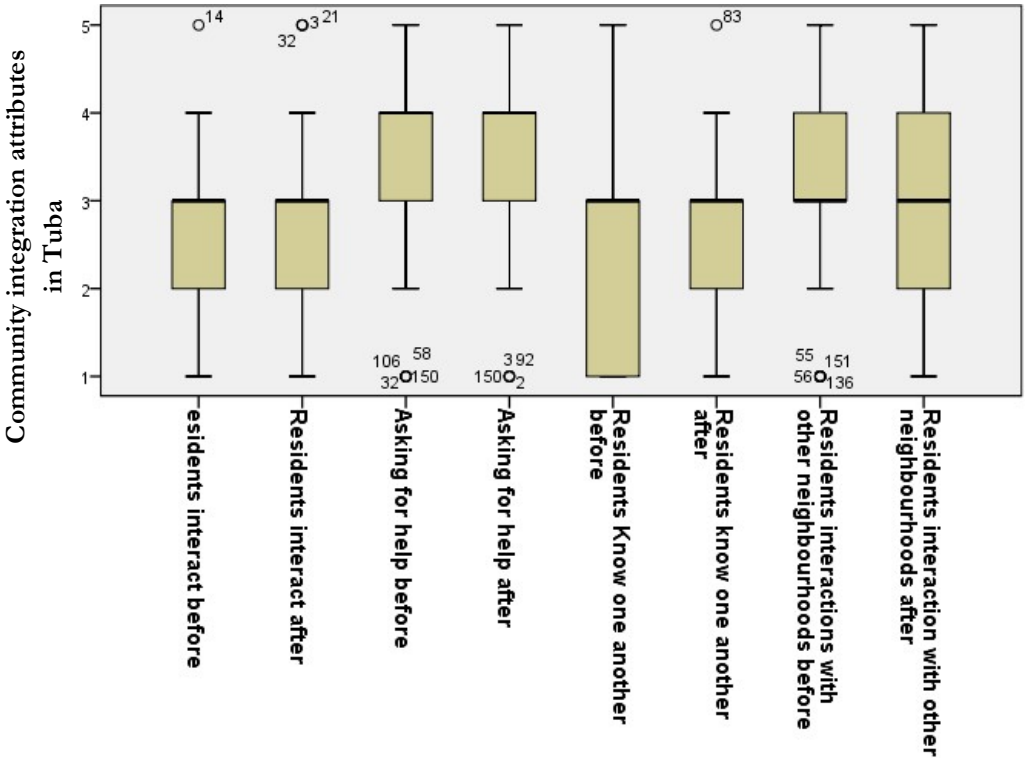
Box plots on symbolic integration in Tuba community



Box plots on symbolic integration in Mataheko community



Box plots on community integration in Tuba community



Box plots on community integration in Mataheko community