Financing for Resilient and Green Urban Solutions in Accra and Tema, Ghana

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FOR A BETTER URBAN FUTURE

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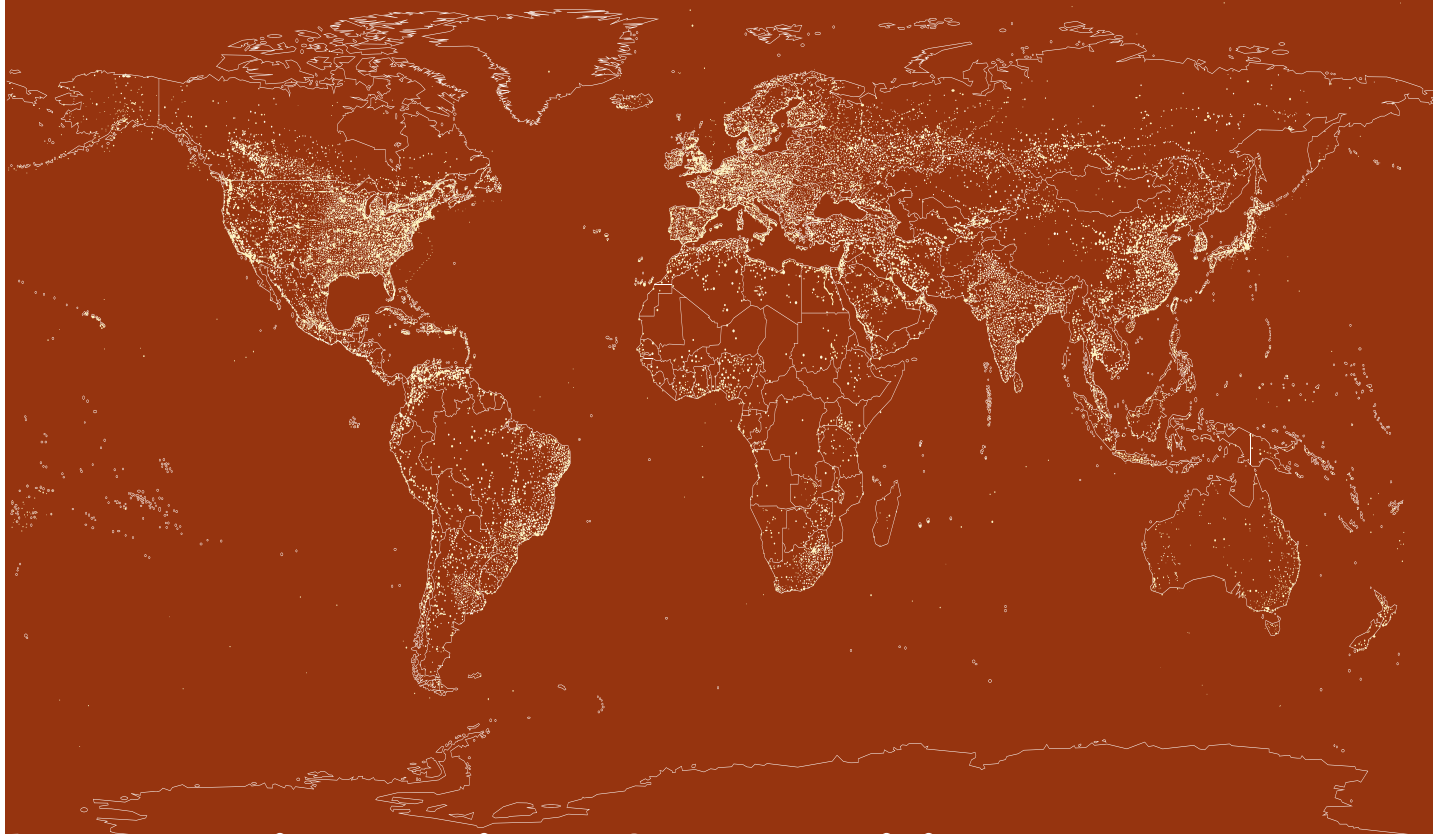## FOR A BETTER URBAN FUTURE

The Initiative on Financing for Resilient and Green Urban Global Solutions (FRUGS)

Financing for Resilient and Green Urban Solutions in Accra and Tema, Ghana

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Abbreviattions

ACARP	Accra Compost and Recycling Plant	LCCR	Low Carbon and Climate Resilient
AfDB	African Development Bank	LCO	Light Cycle Oil
AMA	Accra Metropolitan Assembly	LEGD	Leadership and Excellence in Green Designs
ATMA	Accra Tema Metropolitan Area		
BoS	Balance of System	LPG	Liquified Petroleum Gas
BRRI	Building and Road Research Institute	MIHP	Middle Income Housing Project
BRT	Bus Rapid Transit	MLG	Ministry of Local Government
CAHF	Centre for Affordable Housing Finance in Africa	MMDA	Metropolitan, Municipal and District Assemblies
CO2	Carbon Dioxide	MOFEP	Ministry of Finance and Economic Planning
CSIR	Council for Scientific and Industrial Research	NBFI	Non-Bank Financial Institution
		NEDCo	Northern Electricity Distribution Company
DACF	District Assembly Common Fund	NGO	Non-Governmental Organization
DESAP	District Sanitation Strategic Action Plan	NHP	National Housing Policy
DFI	Development Finance Institution	NHTS	National Household Transport Survey
DFO	Distillate Fuel Oil	NMT	Non-Motorized Transportation
DTCP	Department of Town and Country Planning	NPRA	National Pensions Regulatory Authority
ECF	Extended Credit Facility	PHC	Population and Housing Census
ECG	Electricity Company of Ghana	PNDC	Provisional National Defense Council
ERP	Economic Recovery Program	PPP	Public Private Partnership
FINSAP	Financial Sector Adjustment Program	PV	Photovoltaic
FINSSIP	Financial Sector Strategic Plan	RCB	Rural and Community Bank
GAMA	Greater Accra Metropolitan Area	SAP	Structural Adjustment Program
GBCSA	Green Building Council South Africa	SHC	State Housing Company
GDP	Gross Domestic Product	SSA	Sub-Sahara Africa
GGBC	Ghana Green Building Council	SSIC	Sanitation Standard Implementation Committee
GGC	Ghana Grid Company		
GHG	Green House Gas	SSNIT	Social Security and National Insurance Trust
GLSS	Ghana Living Standards Survey		
GOG	Government of Ghana	TCIHP	Traditional Community Improvement Housing Project
GSS	Ghana Statistical Service		
GWCL	Ghana Water Company Limited	TDC	Tema Development Corporation
IDA	International Development Agencies	TMA	Tema Metropolitan Assembly
IGF	Internally Generated Funds	UNEP	United Nations Environment Program
IMF	International Monetary Fund	UNEP-SBCI	United Nations Environment Program: Sustainable Buildings and Climate Initiative
KNUST	Kwame Nkrumah University of Science and Technology		
		VAT	Value Added Tax
KVIP	Kumasi Ventilated Improved Pit	VRA	Volta River Authority
LCA	Life Cycle Assessment	WRI	World Resource Institute

Executive Summary

City Profile

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Ghana is currently divided into 10 administrative regions. The capital city of Ghana, Accra is located in the Greater Accra. Accra is also the capital city of Greater Accra. Together with Tema, the two are the major cities in the Greater Accra Region of Ghana. Although these twin cities are sometimes seen as different cities in Ghana they are functionally and geographically integrated and have similar characteristics. For the purpose of development planning in Ghana, the two cities are part of the Greater Accra Metropolitan Area (GAMA) which comprises the Accra Metropolis, Tema Metropolis, and six other municipalities (i.e. Ga South, Ga East, Ga West, Adenta, Ashaiman and LedzokukuKrowor). While administratively seen as independent, these municipalities are geographically and functionally part of the built-up area of the Accra Metropolis.

Accra has been the capital of Ghana since 1887 when the British defeated the Dutch. Accra began to expand to accommodate the new residents. Under the British rule, the city adopted segregation of settlements for different races. Victoriaborg was formed in the late 19th century as an exclusively European residential neighbourhood, located to the east of the city limits of the time. The boundaries of Accra were further stretched in 1908. This expansion entailed the creation of a native-only neighbourhood, intended to accommodate members of the native population as a means of relieving congestion problems in the overcrowded city centre. Adabraka was thus established to the north of the city. Racial segregation of neighbourhoods was mandated by law until 1923.

Today, the Accra metropolitan area has 894 square kilometres, Accra city has an area of 225.7 square kilometres. It has a population of 2,475,208 people and projected to grow to 3,632,284 by 2035. It metropolitan area has a population of 4,300,000 people. The gross population density for Accra Metropolitan Area is 13 persons per hectare as compared to 6.23 per hectare in 1970[1] (see table below). Accra's

population like that of most urban centres is very youthful with 56% of the population under the age of 24 years; 51% of the population are females. Accra's population like that of most urban centres is very youthful with 56% of the population under the age of 24 years; 51% of the population are females. Accra is the second most industrialised city in Ghana, contributing over 10% to the GDP. Over 30% of the manufacturing activities are located in the area.

Accra's economic sectors consist of the primary, secondary (manufacturing, electricity, gas, water, construction) and tertiary sectors (supermarkets, shopping malls, hotel, restaurant, transportation, storage, communication, financial intermediation, real estate service, public administration, education, health and other social services). The tertiary service sector is the city's largest, employing about 531,670 people. The second-largest, the secondary sector, employs 22.34% of the labour force, or around 183,934 people. 12.2% of the city's workforce are reportedly unemployed, totalling around 114,198 people[2].

Table 1: Accra Population Data (Urban Area)

Year	Population	Growth Rate (%)	Growth
2035	3,632,284	2.65%	444,826
2030	3,187,458	2.71%	399,074
2025	2,788,384	2.09%	274,379
2019	2,475,208	1.97%	185,647
2015	2,289,561	2.13%	229,485
2010	2,060,076	2.13%	206,269
2005	1,853,807	2.13%	185,567
2000	1,668,240	3.34%	252,742
1995	1,415,498	3.41%	218,337
1990	1,197,161	3.41%	184,660
1985	1,012,501	3.24%	149,367
1980	863,134	3.19%	125,347
1975	737,787	3.19%	107,117
1970	630,670	4.80%	131,721
1965	498,949	4.91%	106,367
1960	392,582	8.19%	127,674
1955	264,908	8.38%	87,761
1950	177,147	0.00%	

Source: http://worldpopulationreview.com/world-cities/accra-population/

The city of Tema emerged from a small fishing village known as Torman. The residents of Torman grew the calabash plant (gourd), known as Tor in the local language, hence the name of the village Tor-man, meaning town of gourd - which was later corrupted to Tema (National Commission on Culture, 2013). Apart from crop production, the people of Tema were and are engaged in fishing in the lagoons and the sea. The development of Tema is largely attributed to the establishment of a habour in the area.

Table 2: Population of Accra and Tema, 1970 to 2010

District	1970		1984		2000		2010
	Population	Growth Rate	Population	Growth Rate	Population	Growth Rate	Population
Accra Metropolis	636,667	3.0	969,195	3.3	1,658,937	1.1	1,848,614
Ledzokuku-Krowor	-	-	-	-	-	-	227,932
Ga Municipalities*	66,336	4.9	132,786	8.9	550,468	5.0	908,053
Tema Metropolis	102,431	4.4	190,917	2.8	298,432	3.0	402,637
Ashaiman Municipal.	22,549	5.8	50,918	6.8	150,312	2.4	190,972
Adenta Municip.	-	-	-	-	-	-	78,215
Total	827,983	3.5	1,343,816	3.9	2,501,196	3.8	3,656,423

*Includes Ga East, Ga West, and Ga South municipal

Ghana Urban Sprawl: Medium-sized Cities Develop Faster Than Accra

In the past half a century, West Africa has been experiencing intensive and rapid urbanization, which has affected the region's largest and smallest urban centers. Land use maps show that urban built-up areas increased by 140 percent in West Africa between 1975 and 2013 — to occupy 36,400 sq km by 2013 (0.7 percent of the land surface). The settlements distribution map (below) indicates both sprawl of existing urban centers and an increase in the number of small towns. There are a large number of new towns and small towns emerging since 1975. Small and medium-sized towns grow faster than existing large cities. Ghana reflects this trend.

Accra gains a lot of attention for its role as a megacity on the continent, its primacy has actually declined. In 1984, Accra accounted for 24.4% of the national population; by 2010, the figure was 16.6%; by 2019, the proportion of Accra's population to national population declines to less than 7.6% . While the number of small towns (20,000–50,000 people) and medium-sized towns (50,000–100,000) has quadrupled and tripled respectively. Therefore, an interesting and important area for future research will be the economic, financial, socio-political and spatial developments in regional urban centres like Tamale, Tema, Ashaiman, Cape Coast and Aflao.

Source: https://eros.usgs.gov/westafrica/settlements-growth
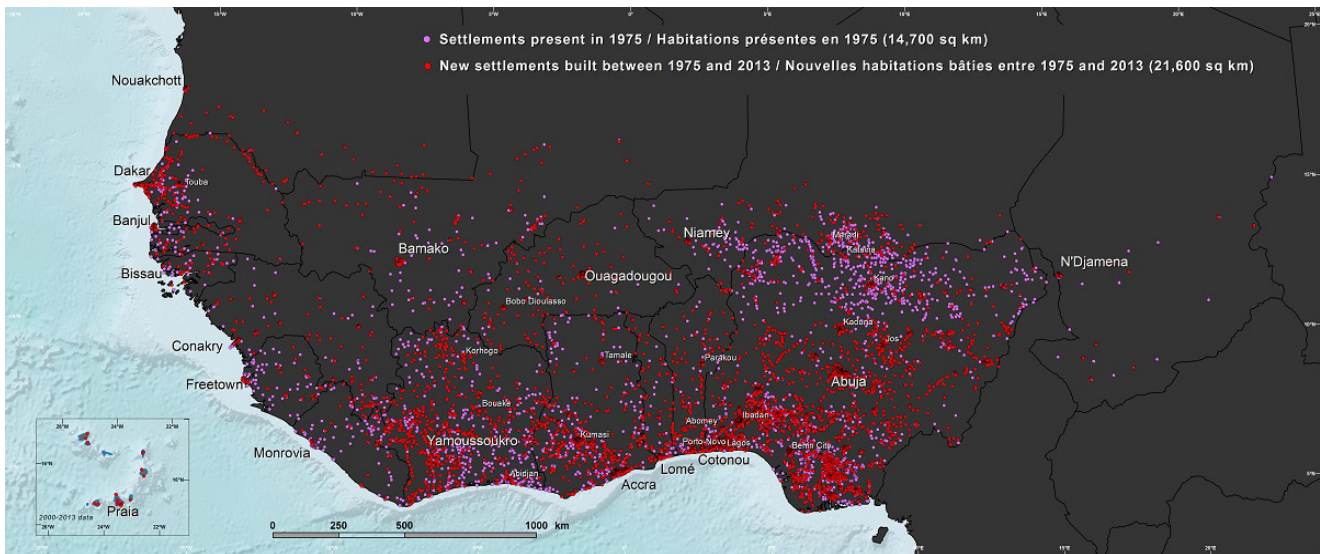
Housing

With regards to the status and financing needs of housing in the two cities. A number of challenges were identified in the two cities.

1. Ghana has a huge housing shortage of 5.7 million new units by 2020. Much of the housing shortage lies in Accra. The cost of newly built cheapest housing unit is USD66,667 in 2017. Meanwhile, the housing need in Accra and Tema is estimated at 37,100 units annually for the next decade and requires $1.85 billion of annual investment.

2. Most people cannot afford decent housing. More than 95% of the population in Ghana cannot afford the cheapest formal housing unit even with finance. The annual mortgage interest rate ranged from 28% to 33% in 2017[3].

3. There is a shortage of the available and affordable lands in the cities. Accra and Tema can be considered to be choked and so there is little land available for residential buildings. Lands in the two cities are considered to be prime lands and so they attract a premium. We have observed that many of the areas that are considered the "Accra" are commercial areas. What this means for the residential housing sector is that these lands will not be affordable even if they are made available.

4. Both cities face challenges on land ownership and litigation. Land ownership in Ghana has traditionally been at the family level and so it often takes community or clan decision to determine what the lands can be used for. In the case of very large families, there are often divisions on the use to employ the land to and sometimes

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ownership disputes which give rise to high risks for buyers. This has constrained buyers from buying lands in Accra and Tema and this has further worsened the housing situation over the years. Land litigations are common in the Greater Accra region as a whole and this has deterred potential acquirers in the past.

5. The cost and processes involved in land registration and obtaining building permits are very lengthy and take about a year to complete. We found out that it cost about 50% of the cost of the land to register and obtaining permit. This makes potential homeowners not to register their land or acquire permits before constructing their buildings.

6. Both cities also have supply side constraints such as the high cost of construction materials. Building materials are generally considered to be expensive in Ghana. This serves to deter individuals and real estate firms from constructing residential buildings. The study highlights several challenges above that hamper the delivery of affordable housing on a scale that meets the needs of lower middle-income households. Construction costs have increased rapidly over the past two decades and have averaged at rates higher than the rise in general price levels mainly due to the reliance on imported building materials. Another challenge is the high cost of urban land and the lack of basic infrastructure for lands at the periphery of the cities. The lack of access to long-term and cheaper funds is also a major bottleneck in the delivery and purchase of housing units. Several approaches have been discussed that seek to proffer solutions for reducing construction costs, lowering the cost of land and the cost of finance. These include encouraging the use of cheaper alternative building materials such as pozzalana cement, increasing the supply of land for housing through the provision of basic infrastructure to improve access and increasing the supply of long-term credit to the housing sector.

7. Much of the housing stock is constructed to be green and resilient. The incremental cost of developing housing with the requirements of green developments relative to conventional developments, the study found that it will costs between 3 and 10% higher to build in a sustainable way than in the business as usual way. However, savings arising from reduction in energy and water use over the life of the building may justify incurring this extra cost.

Sanitation and water

One of the many challenges identified is the inadequacy of Transfer stations in the city. Transfer stations are warehouses that hold solid waste temporarily for onward collection to land fill sites and other end points. We identified that there are two transfer stations that serve Accra but these are inadequate. According to city authorities, four stations are required instead of two. Overall, two new stations and an expansion of one of the existing ones are required to meet the needs of the city of Accra. In addition to this, maintenance of facilities at Tema is required.

Secondly, there are inadequate land fill sites in the city of Accra. Solid waste is mostly taken out of the city to neighbouring districts, including Tema for disposal. There is the need to obtain additional engineered land fill sites in the region as whole. At the moment, it is not optimal to site new landfills in the cities. As already mentioned in the section on housing, lands in the city are considered to be prime and so are generally difficult to obtain. There is therefore the need to acquire new sites at the outskirts of the cities. In addition to land fill sites, there is the need for recycling facilities to be established to manage waste in the two cities. This venture should be left to the private sector, with appropriate regulation. For liquid waste, there is the need for addition pumping stations, maintenance of the existing drainage system and extension of drainage and sewage networks to new settlements. This is necessary for both cities. We find that many of the facilities in the existing drainage and sewage network

are old and need replacement. The emergence of new settlements within and around the cities gives rise to the need to extend the network to these areas.

With regard to water supply, we established from official sources that there is excess supply in the two cities. The major challenge however is the distribution channels. There is the need to replace or maintain older pipelines and lay new lines in new residential areas within and around the cities. The annual deficit in sanitation financing in Tema and Accra are $7m and $8.4m respectively.

Roads

Challenges in the road sector are essentially financing. Only a third of roads in Tema are paved. Tema requires $82m to pave the currently unpaved roads and $254,978.25 annually for maintenance. More than half of roads in Accra are paved. The financing requirement for paving currently unpaved road in Accra is estimated at $104,169,398.949 and an annual maintenance cost of $510,000. We highlight the financing needs in chapter two. The needs that require financing are maintenance of existing roads and the construction of paved roads.
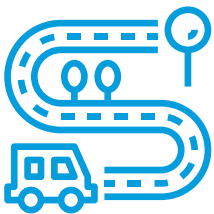
Low Carbon and Resilient Housing and Infrastructure

The study also examined the existing housing stock in both cities and found them to be of materials that do not meet the requirements for sustainable and green developments. In fact, the concept of resilient and green urban development is yet to be embraced in any meaningful way in both cities as reflected in the lack of green developments as well as the absence of planning tools to mandate or incentivize the adoption of such developments.

The study found that more than half of the energy generated in both cities is from thermal sources with solar contributing only 0.1% of total energy generation. In addition, the study found that besides travelling on foot, which constitutes about 47% of all travels to and from

Only a third of roads in Tema are paved

Only 0.03% of households relies on rainwater as a source of water for any purpose.

workplaces in both cities, the use of trotros (mini buses) and shared taxis are the two other major means of travel with both representing 19% and 12% respectively. The use of bus transportation, which constitutes the main public mass transit system, accounts for only 1.2% of urban transport. Rail transport is yet to be developed and plays a very insignificant role in the transportation system in both cities.

Pipe-borne water remains the main source of water for residents in both cities even though there are several challenges including the lack of reliable service delivery. In fact, the lower to middle income households tend to obtain water either from standing pipes outside their homes or from tanker services, which are often more costly. Strikingly, only a tiny percentage (0.03%) of households relies on rainwater as a source of water for any purpose. This is in sharp contrast to the goal of the national water policy to make rainwater harvesting a key part of households' water consumption.

Waste management in both Accra and Tema principally involves the collection and dumping of waste into landfill sites. In general, waste management practices that emphasize the three key sustainable principles - reduce, reuse, recycle- have not yet been adopted on a large scale even. Financing the management of waste remains a big challenge and in recent times, the cities have resorted to the use of the polluter-pays principle to get households to directly pay for waste collection by private waste management companies.

The study also examined the opportunities for launching new instruments for financing low carbon and resilient developments and recommended several instruments including a green loans programme, research and development fund to support the development and promotion of sustainable building materials and construction practices among others. To improve the efficiency and effectiveness of financial and technical support, it is recommended that technical support to the cities must enhance their capacity to employ land use regulatory powers to provide incentives for developing resilient and green housing and infrastructure. Furthermore, the study reveals a number of areas international

development agencies can provide support to the financial sector and notes the financing and capacity building opportunities that exist in both cities such as to provide technical support to deepen the financial sector development and the development of debt instruments.

The report notes several opportunities that can be harnessed to spur activity in resilient and green developments. In line with this, a number of recommendations are offered including the following. First, it is recommended that, to spur activity in green housing development projects, a pilot project be set up to demonstrate the prospects of alternative materials that meet the requirements for green developments. Secondly, it is suggested that a programme be designed that seeks to identify all innovative ideas that have the potential to advance the quest for greener communities and provided with the needed technical and financial support to make them into viable businesses.

Thirdly, the existing programmes such the Government of Ghana sponsored Rooftop Solar Photovoltaic (PV) Programme should be expanded to provide support to more households. Innovative financing mechanisms such as the proposed green loans programme can provide a sustainable source of funding. It is further recommended that a rainwater harvesting systems installation be created to facilitate the widespread installation of these systems across both cities.

With respect to existing financial instruments and systems, we document varied implications for financing green and resilient urban cities. Though the report highlights a huge housing deficit that needs to be closed, financing the housing deficit is a challenge as a result of unavailability of appropriate medium to long term financing instruments largely as a result of macroeconomic instability resulting in not only high cost of the financing instruments but also shorter maturity of the financing instruments. Though, the new government has proposed a housing bank as a solution to the financing challenges, we believe that, this single effort by government is largely insufficient in addressing the housing needs in Accra and Tema beyond. Private sector intervention is needful in complementing government's effort

at addressing the financing challenges. Given current economic challenges running into the medium to the long term, government does not have the fiscal space to adequately resource the housing bank to solve all the problems. Ghana's debt to GDP ratio is approximately 74% as at the end of 2016 that also saw fiscal slippages running to 9% of GDP, whilst debt servicing takes approximately 40% of tax revenue with wages and salaries and gratuities absorbing almost 45% of tax revenue, it will be very difficult for government alone to shoulder the problems going forward. The Lack of national identification system significantly increases the information asymmetry which further increases the risk of dealing in the sector

Suggestions for Future Research into Accra and Tema

Based on our study, we think that further studies are needed, which can focus on the impact of monetary and fiscal regimes on the development of suitable financing solutions for resilient and urban development in Ghana. Given the study's findings of acute financing challenges, it is proposed that further studies examine the complementary roles of monetary and fiscal policies on the development of appropriate financing instruments, payment systems, and regulatory environment supportive for financing resilient and urban development

Perennial flooding especially in Accra and Tema calls for the further studies in understanding how green and urban development can be packaged as lasting solutions to these negative occurrences. In that regard, opportunities and challenges in achieving resource efficiency for green and resilient urban development in the two cities become paramount for further studies. Relatedly, achieving sustainable water resources management in the two cities as well as human waste management in the face of pollution of water bodies and utilities pricing inefficiency present further research needs. Evidenced-based policy framework towards a sustainable green and resilient urban development for the two cities will be an important outcome from the earlier study

Inequality is rising in Africa and Ghana for that matter, it would be necessary to ascertain how the rising inequality how impact the development of green and resilient urban development in the two cities which has implications for affordability. In this regard it would useful to assess the complementary role of remittances in the financing and development of green and resilient urban development.

The need to ascertain the local regulatory capacity in land management, planning, environmental management, infrastructural systems development which involve the active collaboration with central government, financial players, customary landholding institutions towards a suitable model for managing green and resilient urban development will be key. How does Ghana's land tenure system support or impede development of green and resilient urban solutions.

Given the binding fiscal constraint and the huge infrastructural deficit, alternative innovative financing models should be developed involving development of appropriate regulative regime conductive for involvement of private pension funds/diaspora financing instruments, non-governmental and communities to complement local financial system. It should explore ways to mobilise and use the local resources such as the development of bond markets.

The challenges facing green and resilient housing and infrastructure are not just the lack of capital, but more on how to mobilise capital. Considering the rapid economic development in recent years, the interest from the international community and private sector in urban development in Accra and Tema is very high. The main challenge is the financial and technical capacity with the public sectors, and the ability to find bankable and investment-ready projects. There is a big need to strengthen the capacities of central government of Ghana and local governments in Accra and Tema to prepare bankable projects particularly in housing, infrastructure, energy and green development. International technical and financial support in these areas are highly needed.

Recommendations for Further Detailed Work and Intervention

1. Examining the impacts of Monetary and Fiscal Policies on the Development of Financial Instruments:

Further FRUGS studies need to focus on the impact of monetary and fiscal regimes on the development of suitable financing solutions for resilient and urban development in Ghana. Given the current FRUGS study's findings of acute financing challenges faced in Accra and Tema, and in Ghana as a whole, there is a great need for FRUGS future studies to examine the complementary roles of monetary and fiscal policies on the development of appropriate financing instruments, payment systems, and regulatory environment supportive for financing resilient and urban development.

2. Develop an Efficient Land Management System:

The FRUGS study shows that the obstacle for affordable housing is the inefficient land management system in Ghana. The land ownership and titles are often not clear. Or they are often held in joint ownership. An estimated 80 percent of land holders are under customary law. The cost and processes involved in land registration and obtaining building permits are very lengthy and take about a year to complete. It cost about 50% of the cost of the land to register and obtain permit. This makes potential homeowners not to register their land or acquire permits before constructing their buildings.

The need to ascertain the local regulatory capacity in land management, planning, environmental management, infrastructural systems development which involve the active collaboration with central government, financial players, customary landholding institutions towards a suitable model for managing green and resilient urban development will be key. How does Ghana's land tenure system support or impede development of green and resilient urban solutions?

Further FRUGS can concentrate on the improvement of the land management system and help to develop an efficient land market.

3. Develop a Municipal Bond Market and Facilitate Bond Issuing in Accra, Ghana:

Ghana has launched a Financial Sector Adjustment Programme (FINSAP) to address the problems in the financial sector. However, Ghana still lacks a well-established banking sector and local commercial banks usually find it difficult to provide long-term loans for infrastructure projects. Infrastructure projects often require funding that would exceed the amount that a local commercial bank can lend to a single customer under banking regulations. They are not well positioned to finance infrastructure that is intended to generate revenues over a very long period, often between 20 and 30 years.

Therefore, in order to meet the infrastructure financing needs, there is a great need to finance local infrastructure and projects through the bond market. A number of international financial institutions such as World Bank and African Development Bank, have stressed the need of issuing municipal bonds to finance infrastructure projects. Along this line of thinking, further FRUGS work can conduct studies on the constraints and challenges to the development and the implementation of a domestic bond market, and the applicability of such experiences to Ghana, and on how to remove obstacles for the development and implementation of municipal bond market, and assist Ghana to develop an efficient bond market.

4. Promote the local building materials industry:

The construction sector in Ghana expanded rapidly in recent years. The construction sector's contribution to the overall industrial development grew from 29.8 per cent in 1993 to 33.9 per cent in 1999 to 34.3 per cent in 2000. The sector's share of industrial sectors output reached 36.3 per cent in 2005 up again from 35.6 per cent registered in 2004. The construction sector's contribution further improved from 36.9 per cent in 2010 to 37.4 per cent in 2011 (see Chart below)[4].

Considering the rapid increased demand for building materials due to the boom of construction industry, the local building materials industry is not well development. This leads to that the local building materials are very expensive and often not available. There is huge needs to develop the local building materials industry. Further FRUGS work can concentrate on promoting the development of the building materials industry in Ghana. It can explore the possibilities to import building materials production technologies from Germany and other countries. KfW and other development partners can provide export finance to Ghana to promote its local building materials industry development.

Share of Construction Subsector to Industrial Sector

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007*	2008*	2009**	2010**	2011**
Construction	2.868	39	55.22	55.65	120	147.4	177.2	256.6	354.7	451.6	556.6	705	557.7	1085	1562	1702	2006	2455	5051
Electricity and Water	0.996	15.86	20.56	30.19	42.57	44.84	55.15	75.16	102.9	151.7	176.6	206.9	266.9	564.7	552.2	405.6	467.6	540.1	652.1
Manufacturing	5.655	47.55	72.55	97.57	127.5	155.5	185.7	244.8	542.5	441.5	595.5	695.4	841.5	855.6	1067	1504	1575	1855	2200
Mining and Quarrying	2.114	29.55	57.15	55.64	71.95	89.55	104.9	135.2	179.6	250.7	510.9	566.5	447.2	594.9	771.6	1057	1585	1825	2246

Source: https://pdfs.semanticscholar.org/80e8/e45bcb8be45a2dc11520c013a1f5d5326b5f.pdf

5. Financing transport development in Accra and Tema:

Tema requires USD 82 million to pave the currently unpaved roads and USD254,978 annually for maintenance. More than half of roads in Accra are paved. The financing requirement for paving currently unpaved road in Accra is estimated at USD 104 million and an annual maintenance cost of USD 510,000. The needs that require financing are maintenance of existing roads and the construction of paved roads. It also requires the development of railway infrastructure, the rehabilitation of the existing 56 km narrow gauge line from Kojokrom to Tarkwa; and rehabilitation works on the 70.8km narrow gauge sections of the Eastern Railway Line from Accra to Nsawam and Accra to Tema. Work on Tamale Airport Phase II received regulatory approvals for the construction of a new Terminal building and will serve the Sahelian region, as well as the expansion of airports in Tamale and Kumasi, as well as the expansion of the Takoradi and Tema Ports[5]. Further FRUGS work can assist the two cities to develop feasibility studies and develop financing plans for the road development projects in Accra and Tema.

6. Developing and improving solid waste treatment facilities:

The solid waste treatment facilities in Accra is inadequate, and should be doubled. Landfill sites are also inadequate. In addition to land fill sites, there is the need for recycling facilities to be established to manage waste in the two cities. Further FRUGS work can explore the modes of providing solid waste treatment facilities and on financing modalities.

7. Sewage Treatment Facilities:

There is the need for addition pumping stations, maintenance of the existing drainage system and extension of drainage and sewage networks to new settlements. This is necessary for both cities in Accra and Tema. Many of the facilities in the existing drainage and sewage network are old and need replacement. The emergence of new settlements within and around the cities gives rise to the need to extend the network to these areas. Further FRUGS work can focus on the assessment of the needs for sewage treatment facilities and financing, design financing solutions for the provision of sewage treatment facilities.

8. Designing green and resilient urban solutions in Accra and Tema:

Perennial flooding especially in Accra and Tema calls for further FRUGS studies into understanding how green and resilient urban development can be packaged as lasting solutions to these negative occurrences. In that regard, opportunities and challenges in achieving resource efficiency for green and resilient urban development in the two cities become paramount for further studies. Relatedly, achieving sustainable water resources management in the two cities as well as human waste management in the face of pollution of water bodies and utilities pricing inefficiency present further research needs.

Evidenced based policy framework towards a sustainable green and resilient urban development for the two cities will be an important outcome from the earlier study

9. Tackling increased inequality challenges in Accra and Tema:

Because of the rising inequality in Ghana and Africa, it would be necessary to ascertain how the rising inequality how impact the development of green and resilient urban development in the two cities which has implications for affordability. In this regard it would useful to assess the complementary role of remittances in the financing and development of green and resilient urban development.

10.Developing alternative innovative financing models:

Given the binding fiscal constraint and the huge infrastructural deficit, alternative innovative financing models should be developed involving development of appropriate regulative regime conductive for involvement of private pension funds/diaspora financing instruments, non-governmental and communities to complement local financial system.

11.Developing a Rapid Mass Public Transit System:

This study finds that besides travelling on foot, which constitutes about 47% of all travels to and from workplaces in both cities, the use of trotros (mini buses) and shared taxis are the two other major means of travel with both representing 19% and 12% respectively. The use of bus transportation, which constitutes the main public mass transit system, accounts for only 1.2% of urban transport. Further FRUGS work can focus on the promotion of public transport and conduct a feasibility study for establishing a rapid mass transit system in Accra.

12.Developing Public-Private Partnership Initiative for Housing and Infrastructure Development:

Ghana has started to explore the public-private partnership (PPP) since 2018.

The Government of Ghana, through the Ghana Highway Authority, an agency of the Ministry of Roads and Highways has initiated the first PPP project for the upgrading of the Accra-Tema Motorway PPP project in 2018. The project has been valued at US$200 to 300 million. The Accra-Tema motorway is a 19km dual carriageway.

Public-Private Partnership has great potential for financing road infrastructure and housing in Accra and Tema, and in Ghana in large. This method of financing comes in the form of an agreement between a private entity and the government where the private entity finances road or other transport infrastructure in return for the right to collect user fees to repay the cost of construction over a period and to provide profit for the funding entity.

Governments aim to attract matching funds from private partners via the Ghana Infrastructure Investment Fund (GIIF). the GIIF finances infrastructure development in power generation, railways, roads and port services. Considering the government is running in deficit, it is crucial to attract private sector financing for infrastructure development.

13. Financial Instruments to Support the Delivery of Affordable Green Housing Development

Develop financial instruments to support the affordable and green housing development in Accra and Tema and in Ghana in large. The following financial instruments are recommended to be introduced or developed.

Table 3: Financial Instruments to Support the Delivery of Affordable Green Housing Development

Instruments	Purpose	Target	Source of Funding
Green and Affordable Housing Research and Development Fund	To support the development and promotion of alternative locally made low carbon and climate resilient building materials.	Grants and soft loans to qualified research institutions and private firms.	Government of Ghana Development Finance Institutions (DFIs)
Loans for Supporting Incremental Building Practices	To provide construction loans in a manner consistent with incremental building practices. Most households in Ghana still use incremental building technologies to build their houses.	Lower and middle lower income households	Local Financial Institutions with technical and financial support of DFIs

Green Loans Programme	To provide loans for the installation of solar panels and water harvesting systems in new and existing houses on terms that match monthly repayments to savings in utility costs.	Lower and middle lower income households	Local Financial Institutions with technical and financial support of DFIs.
Affordable Housing Development Loans	To provide construction loans at concessionary terms to developers engaging in affordable housing projects that fall with a given price range and incorporate green features.	Real Estate Developers	DFIs through Local Financial Institutions
Housing Loans Guarantee and Support Program	To provide guarantees for lower and lower middle income earners who would otherwise not qualify for conventional mortgages and long-term funds to mortgage finance institutions for on-lending to the lower and lower middle income earners at below market terms.	Lower and lower middle income earners	DFIs through Local Financial Institutions.

Chapter 1

Urbanisation, Economic and Financial Systems

1.1 Brief History of Accra and Tema

Ghana is currently divided into 10 administrative regions. The capital city of Ghana, Accra is located in the Greater Accra. Accra is also the capital city of Greater Accra. Together with Tema, the two are the major cities in the Greater Accra Region of Ghana. Although these twin cities are sometimes seen as different cities in Ghana (see GSS 2012), they are functionally and geographically integrated and have similar characteristics. For the purpose of development planning in Ghana, the two cities are part of the Greater Accra Metropolitan Area (GAMA) which comprises the Accra Metropolis, Tema Metropolis, and six other municipalities (i.e. Ga South, Ga East, Ga West, Adenta, Ashaiman and LedzokukuKrowor) (see Figure 1.1). While administratively seen as independent, these municipalities are geographically and functionally part of the built-up area of the Accra Metropolis (Owusu, 2013). For many Ghanaians, therefore, Accra is seen as a big city which has all the above municipalities including Tema. As a result of lack of empty spaces within the Accra and Tema municipalities, many of the new housing development projects in Accra are actually taking place in these other municipalities within GAMA (Owusu and Oteng-Ababio, 2015). We will, where appropriate, refer to the entire GAMA in our presentation on the Tema and Accra Metropolitan Areas. It needs to be mentioned, however, that Accra and Tema have distinct histories which are presented in the sections below.

Figure 1.1: Map of the Greater Accra Metropolitan Area (GAMA) showing Tema and Accra Municipalities
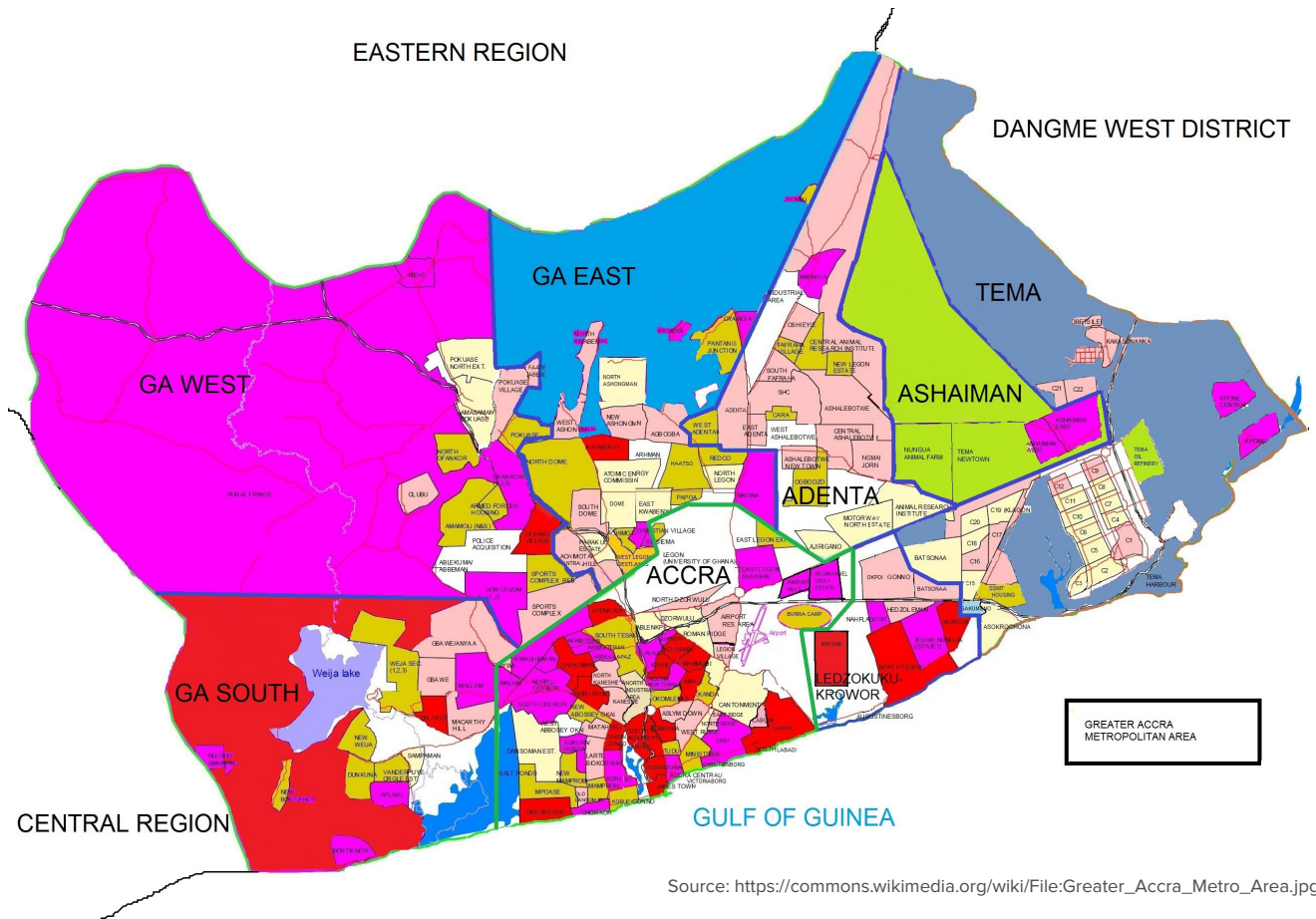
Source: https://commons.wikimedia.org/wiki/File:Greater_Accra_Metro_Area.jpg

1.1.1 History of Accra

It is generally believed that the name Accra was derived from the Akan word "nkran" which means "an army of ants". The then small fishing community was given this name because the area was occupied by thousands of anthills. Nkran was later corrupted by the Danes to Akra, then to present-day Accra. Historical accounts suggest that Accra was first settled when the Ga people migrated from Nigeria to the Accra plains in the beginning of the 15th century. The main economic activities undertaken by the early settlers of Accra were farming and lagoon fishing. The economic significance of Accra was enhanced after the arrival of the Europeans in 1482 and subsequent construction of trading posts, namely Fort Crevecoeur, built by the Dutch in 1650 (and later renamed Ussher Fort), Christianborg Castle, built in 1661 by the Danes, and Fort James which was built by the British in 1673.

During the period when these forts were being constructed, people migrated from other villages on the Accra plains to Accra because of tribal wars in other villages and the desire to trade with Europeans in Accra (Macalester, 2016). As a result of the massive migration to Accra, three coastal villages, namely Osu (Christiansborg), Dutch Accra (later called Ussher Town), and James Town, sprang up to become the core of what was to be Accra. Accra grew into a prosperous trading centre during the slave trade era due to the nearby forts. Although the mass movement of people to Accra declined slightly after 1807 when slave trade was abolished, the decision by the colonial administration in 1877 to relocate the capital city of the then Gold Coast from Cape Coast to Accra contributed to the development of the city of Accra (MLG/DTCP 1993), as it attracted significant public and private investments towards its infrastructural development over the years (Owusu, 2013). Before becoming the capital city of Ghana, the settlement of Accra was confined between Ussher Fort to the east and the Korle Lagoon to the west (Macalester 2016.). However, after its establishment as a capital of Ghana, the British colonial administrators and local people moved to areas around Christiansborg fort (i.e. Labone, Osu, Ministries, Cantonments and Ridge) and

the city began to expand to accommodate the new residents. Macalester (n.d) further asserts that Victoriaborg was formed in the late 19th century as an exclusively European residential neighborhood, located to the east of the city limits beyond the Ussher Fort. The boundaries of Accra were further stretched in 1908 with thecreation of two native-only neighbourhoods near the present Adabraka, intended to accommodate members of the native population as a means of reducing congestion problems in the city. Accra further experienced rapid growth during the early twentieth century since it became the main port for the export of cocoa. Availability of piped water which was established in 1915 also drew more migrants from the rural areas. The city of Accra had a population of over 42,000 by 1921 but the population increased to 60,726 in 1931 and to 133,192 in 1948 (Macalester, 2016).

Theincrease in population was attributed to massive migration of both local people and European businessmen and administrators into the city. The Europeans settled in well-planned low-density areas while many of the rural migrants settled in neighbourhoods such as Nima and Accra New Town which had not yet been incorporated into Accra's municipal boundary, with the development of these neighbourhoods being unregulated by the government, creating a crowded and jumbled landscape. In the Central Business District (CBD) of Accra, more administrative buildings were built on High Street.

In 1944, Maxwell Fry was appointed to draw a town plan for Accra but that plan was later revised in 1958 by B.D.W. Treavallion and Alan Flood, all of which were never implemented. The Nkrumah government which governed Ghana from 1957 to 1966 ignored the Fry/Treavallion plan for Accra's development. No comprehensive development/settlement plan was implemented in the period between 1966 and 1981, as Ghana experienced political instability and poor economic performance during this period. Improvement in the economic and political situation in the country since 1981, under the leadership of President Rawlings as well as the implementation of

Accra was enhanced after the arrival of the Europeans in **1482**

Availability of piped water which was established in **1915** also drew more migrants from the rural areas

The city of Accra had a population of over 42,000 by **1921** but the population increased to 60,726 in **1931** and to 133,192 in **1948**

Structural Adjustment Programmes since 1983 contributed to the development of the modern city of Accra. Thus, although Accra's growth dates back several decades, the rapid development of the city occurred in the last three decades of economic liberalization and globalization (Grant and Yankson, 2003; Owusu, 2013). Within the last three decades, the population of GAMA increased from about 828,000 in 1970 to over 2.5 million in 2000 and over 3.6 million in 2010.

As the population increased, some existing villages within the Accra plains have been 'swallowed' by Accra. Today, villages such as Adenta and Madina are all part of Accra. The city of Accra which was initially located around the forts built by the Europeans has expanded with no regard to zoning. The city has a total area of 225.7 km2, and is the major city of the Greater Accra Metropolitan Area (GAMA). The development of most settlements in GAMA has not been based on any comprehensive plan. Since the 1990s, however, private developers have created modern residential areas and gated communities such as Trasacco Estate, Manet Estate, and Regimanuel Estate among others. These estates are usually occupied by wealthy people, wealthy business men, politicians and expatriates.

Today, the city is also a transportation hub, home to the Kotoka International Airport, and railway links to Tema, Sekondi-Takoradi and Kumasi. Accra has become a location for national and international business conferences, and a regional centre for West Africa (see Picture below)[6].

Source: https://informationcradle.com/africa/accra-city-ghana/

1.1.2. History of Tema

The city of Tema emerged from a small fishing village known as Torman. The residents of Torman grew the calabash plant (gourd), known as Tor in the local language, hence the name of the village Tor-man, meaning town of gourd - which was later corrupted to Tema (National Commission on Culture, 2013). Apart from crop production, the people of Tema were and are engaged in fishing in the lagoons and the sea. The development of Tema is largely attributed to the establishment of a habour in the area. Indeed, in the early 1950s when Ghana was still governed by the British colonial administration, increasing international trade placed a lot of pressure on Ghana's open sea ports and hence there was the need to identify a new area for a second deep -water habour. The small fishing village of Tema was selected in 1951 as the best site for that new seaport because its deep offshore waters would minimize dredging. Another factor that led to the selection of Tema as the best site for the construction of a harbour was its proximity to the Volta and Accra rivers.

The Tema habour was formally opened in 1962 and it enclosed 410 acres of the sea, making it Africa's largest man-made harbour. The habour has 3 miles (5 km) of breakwaters, an oil-tanker berth, 12 deepwater berths, and a dockyard, warehouses, and transit sheds. A separate fishing harbour with cold-storage and marketing facilities was also developed east of the lee breakwater (Tema, 2016). Many manufacturing industries were also located in the Tema industrial area, creating several jobs opportunities in this industrial city.

In addition to the above facilities, the government acquired 166 square km of land north of the harbour and entrusted it to the Tema Development Corporation (TDC) in 1952 to be used for the construction of housing units. The city of Tema was subsequently built on the acquired site and was planned as an industrial-residential complex. Thus, in contrast with the development of Accra which was poorly regulated, the TDC was able to regulate the development of Tema, especially between the 1960s and 1990s. Most of the early neighbourhoods were well planned and provided with basic services, such as water, electricity and roads.

As a result of availability of jobs in the manufacturing industry as well as opportunities for trading activities in the harbours, there has, since 1960, been a mass movement of people from many parts of Ghana. As the population of Tema increased because of the influx of migrants, the Tema Development Corporation was not been able to construct the needed housing and services to meet the needs of the increasing population. This led to the further creation of an area called Ashiaman which was unplanned and has evolved in to a large slum area consisting of shacks. In recent years, Tema has also expanded to merge with other villages like Saki and AdjeiKodjo. Some of these new settlements are quite poorly planned and lack the services available in the planned settlements (i.e communities) constructed by the TDC. Some of the initially well-planned communities have also witnessed the emergency of unauthorised structures built by people to house the increased population.

1.2 Geographic Characteristics of Accra and Tema

Both Accra and Tema are located in the coastal plains of the Greater Accra Region, which is one of the 10 administrative regions in Ghana. Accra is the capital city of Ghana and it is located between latitude 4.5° and 6° N, while Tema is located about 30 kilometres East of Accra (Figure 1.2). The two cities share a boundary and are so geographically and functionally integrated that it is difficult to identify their boundary on the ground. The total land area of the Accra and Tema Metropolitan Areas are respectively 139.674 Km^2 and 87.8 km2 (See Figures 1.3 and 1.4).

The small fishing village of Tema was selected in **1951** as the best site for that new seaport because its deep offshore waters would minimize dredging

The Tema habour was formally opened in **1962** and it enclosed 410 acres of the sea, making it Africa's largest man-made harbour

Figure 1.2: Map of Ghana showing Accra and Tema
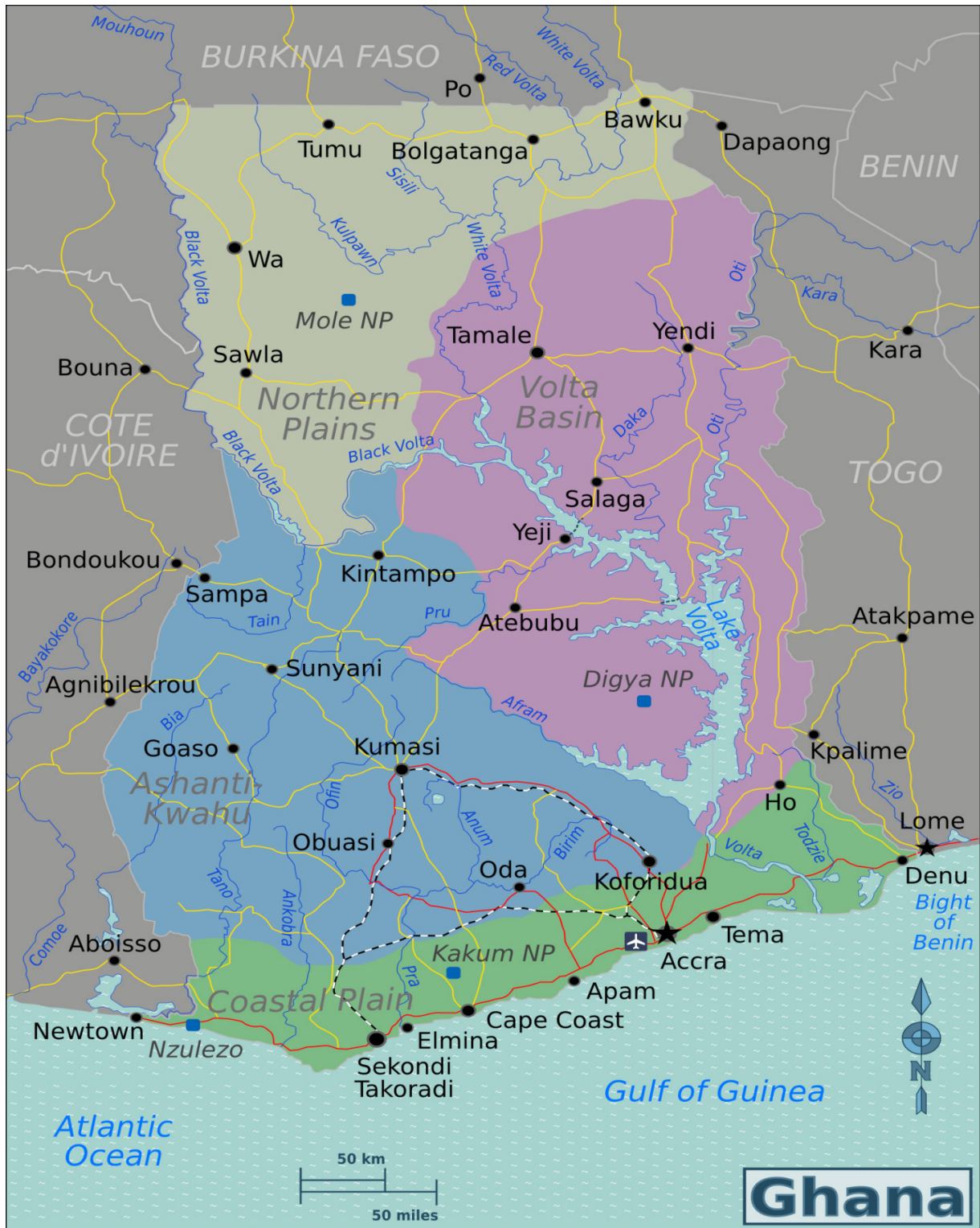
Figure 1.3 Map of Accra Metropolitan Area
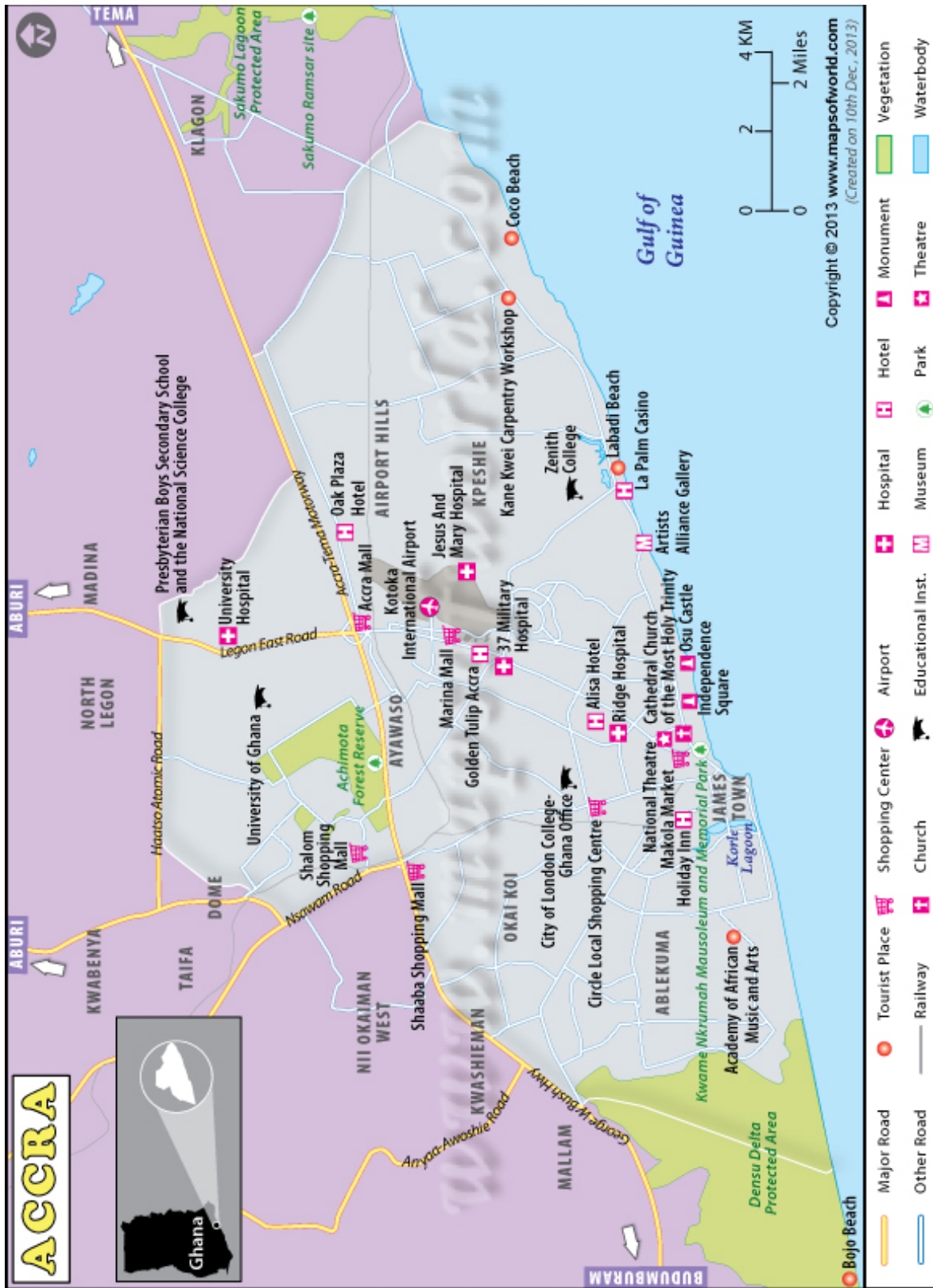
Source: Wikimedia,2010

Figure 1.4 Map of Tema Metropolis
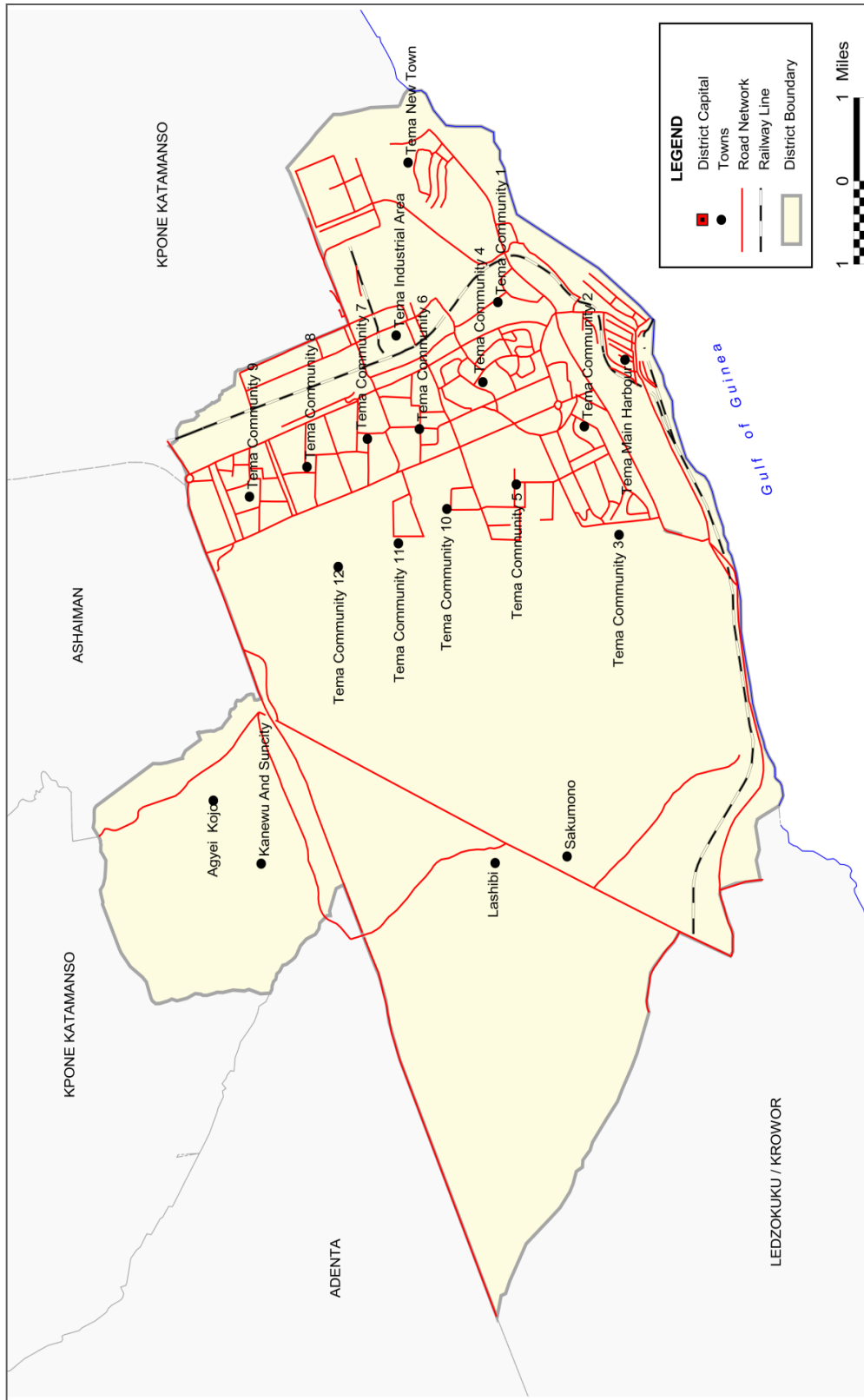
Source: Ghana Statistical Service (2013)

The geology of these 'twin cities' is made up of various types of hard and soft rocks, including granite, quartz, gneiss, schist, sandstone and shales. The area has several resistant rock outcrops, sandy beaches and lagoons. As a result of variations in the underlying rocks, there are different types of soil in these metropolitan areas. These include sand, clay, humus, and silt. The soils generally have low organic content and the top soils are shallow, which limits their productivity. However, vegetables such as cabbage, water melon, garden eggs, tomato, pepper and onions are cultivated in this area.

Like other parts of the coastal plains, the topography of the Accra and Tema Municipalities is generally flat. The terrain of the Tema area is largely less than 35m above sea level, but a few hills are found in the Eastern and Western parts of Accra. As a result of the flat nature of land, poor settlement planning and ineffective drainage facilities, the two cities experience floods periodically. The flat nature of the land, however, provides a good setting for settlement development.

In terms of climate, the Accra-Tema area is located in the dry equatorial climatic zone, which is characterized by two rainy seasons. The major rainy season starts in April and ends in June, while the minor rainfall period is from September to November. The annual total rainfall average of the coastal plain where the two cities are located is 800mm, which is the lowest in Ghana. There is a high variability of rainfall at the seasonal and multi-decadal scales (Ofori-Sarpong&Annor, 2001). Seasonal analysis of rainfall data by Owusu and Teye (2016) indicates that about 75 per cent of the rains in the Accra-Tema area is recorded in the summer months, while only a 25 per cent of rains fall in the dry season. Although Accra and Tema lie within Southern Ghana and enjoys a double-maxima rainfall regime, the annual average rainfall recorded in the area is even lower than that of northern Ghana, which is considered to be within a semi-arid zone (Owusu &Waylen, 2009). The annual average of the Accra-Tema area is 26.8°C (Dickson and Benneh, 2001). The low rainfall amount in the area affects agricultural production and availability of water for household consumption

(Owusu and Teye, 2015).

The Accra-Tema area has three main vegetation zones, namely shrub land, grassland and coastal lands. The shrub land, which largely occurs in the western and the northern parts of the country, is made up of small trees of about five meters tall. The grasses are short and usually less than one meter. Ground herbs, which are usually found on the edge of the shrub, include species that flourish after fire. The coastal lands have different species, including mangroves which are found in the tidal zone of estuaries, lagoons and salt tolerant grasses found in low-lying areas of lagoons (GSS, 2013). The original vegetation of the Accra-Tema area has been altered by human activities, including farming and the development of settlements. While a significant proportion of the natural vegetation in these cities has been destroyed as a result of development projects, a few of the areas have been reserved as greenbelts. Tema, which is the main industrial hub of Ghana, however, has more green belts than Accra. This may be explained by the fact that settlements in Tema were better planned than settlements in Accra. In recent years, however, areas reserved as green belts are being destroyed by estate developers.

In terms of drainage patterns, both Accra and Tema have a number of water bodies. The main river that flows through Accra is the Densu. Additionally, there are small seasonal streams flowing from the Akwapim Ridge through various lagoons into the sea. An example is the Odaw River. As Accra is bordered on the south by the Gulf of Guinea, there are ecologically very important lagoons and Wetlands in the city. Tema also has a number of seasonal streams which flow through depressions into the sea during the rainy season. These include the Gynakorgyor which flows into the Gao Lagoon between Manhean and Kpone. As is the case of Accra, Tema also has a number of useful lagoons, such as the Chemu Lagoon which is between the harbour and Tema Manhean. The lagoons in the Accra and Tema area are heavily polluted by industrial liquid waste and domestic waste which have contributed to the destruction of the aquatic life of the lagoons.

From the preceding discussions, it is clear that the physical characteristics of Tema and Accra have implications for the development of affordable housing schemes for the two cities. While the flat nature of the terrain makes construction work relatively easier and cheaper, the existence of low-lying and flood prone areas is a challenge to settlement development. The presence of a number of ecologically sensitive sites (such as lagoons) offers both opportunities and challenges. First, most of these sites are waterlogged which reduces the availability of land for further development. On the other hand, a good settlement plan can be developed to preserve these sites to enhance the aesthetic qualities of the cities. The destruction of the greenbelts of the two cities will also have to be halted by an effective settlement development plan.

1.3 The Population Growth and Urbanization Patterns

This section describes the population growth and patterns of urbanization of the Greater Accra Metropolitan Area (GAMA), in general, and the Accra and Tema metropolises, in particular. This analysis is generally based on data obtained from the 2010 Population and Housing Census which is the most recent census conducted in Ghana.

1.3.1 Current Status of Urbanization of GAMA

Consistent with observed trends in other parts of Africa (Porter, 2012), Ghana's population is becoming increasingly urbanized. The proportion of the population living in urban areas increased from 44% in 2000 to 51% in 2010 and is projected to increase to 63% in 2025 (GSS, 2012). The rapid urbanization is caused by a number of factors, including natural population increase in towns and cities, rural-urban migration, and the reclassification of rural communities to urban once their populations go beyond 5,000, which is the threshold (GSS, 2013). It is believed that if current population growth trends continue, Ghana's population will increase to over 33 million by 2030, with about 75% residing in urban areas (Owusu and Oteng-Ababio, 2015). Although the factors that account for rapid urbanization are complex and multifaceted, there is enough evidence to suggest rural-urban migration is the most important single factor contributing to the growth of the Greater Accra and Tema Areas. Indeed, recent population and housing census reports suggest an 'emptying' of the population of the poorer regions into GAMA (GSS 2012). An analysis of the 2010 PHC suggests that the Greater Accra region where Tema and Accra are located has experienced the highest rate of urbanization in the country.

Table 1.1 Proportion of the Population of Ghanaian Administrative Regions living in urban areas, 1960 – 2010

Region	1960	1970	1984	2000	2010
All Regions	23.1	28.9	32.0	43.8	50.9
Western	24.7	26.9	22.6	36.3	42.4
Central	28.0	29.1	28.8	37.5	47.1
Greater Accra	72.6	85.3	83.0	87.7	90.5
Volta	13.1	16.0	20.5	27.0	33.7
Eastern	21.1	24.6	27.7	34.6	43.4
Ashanti	25.0	29.7	32.5	51.3	60.6
BrongAhafo	15.6	22.1	26.6	37.4	44.5
Northern	13.0	20.4	25.2	26.6	30.3
Upper East	3.9	7.3	12.9	15.7	21.0
Upper West	5.0	6.7	10.9	17.5	16.3

Source: GSS (2012, 2013).

Within the greater Accra region, the GAMA has experienced rapid urbanization than any other part of the region. As shown in Table 1.3, the total population of GAMA rose rapidly from 827,983 in 1970 to slightly over 2.5 million in 2000 and then over 3.6 million in 2010. The population of all the municipalities within GAMA has grown since 1970. However, rapid growth of the GAMA has largely occurred in the outlaying zones located in the North-Western part of the metropolitan area. The annual growth rate of the Accra Metropolis declined from 3.3% for the 1984-2000 period to 1.1% for the 2000-2010 period. The annual growth rate of the Tema Metropolis also declined from 4.4% for the 1984-2000 period to 3.0% for the 2000-2010 period. On the other hand, the annual growth rate of the Ga districts which are found in the outlaying zones increased from 4.9% for the 1984-2000 period to 5.0 for the 2000-2010 period. These figures show that urban sprawl in the GAMA is largely occurring in municipalities surrounding the Accra metropolis and to some extent in the Tema Metropolis as well.

Table 1.2 Relative Share of Population

Region	Relative Share of Population					Annual Growth Rates (%)			
	1960	1970	1984	2000	2010	1960-1970	1970-1984	1984-2000	2000-2010
All Regions	100.0	100.0	100.0	100.0	100.0	2.4	2.6	2.7	2.5
Western	9.3	9.0	9.4	10.2	9.6	2.1	3.0	3.2	2.0
Central	11.2	10.4	9.3	8.4	8.9	1.7	1.8	2.1	3.1
Greater Accra	8.1	10.6	11.6	15.4	16.3	5.2	3.3	4.4	3.1
Volta	11.6	11.1	9.8	8.6	8.6	2.0	1.8	1.9	2.5
Eastern	15.5	14.1	13.7	11.1	10.7	1.5	2.4	1.4	2.1
Ashanti	16.4	17.3	17.0	19.1	19.4	2.9	2.5	3.4	2.7
Brong-Ahafo	8.7	9.0	9.8	9.6	9.4	2.7	3.3	2.5	2.3
Northern	7.9	8.5	9.5	9.6	10.1	3.2	3.4	2.5	2.9
Upper East	7.0	6.3	6.3	4.9	4.2	1.5	2.6	1.1	1.2
Upper West	4.3	3.7	3.6	3.0	2.8	1.0	2.3	1.7	1.9
National	6,726,815	8,559,313	12,296,018	18,912,079	24,685,823				

Source: Owusu (2013), based on GSS (2005; 2012)

In an attempt to explain why surrounding municipalities are growing more than the GAMA, Owusu (2013) asserts that as result of lack of space for further development within the Accra metropolis, a greater proportion of the population of the GAMA is settling in surrounding municipalities, especially in the Ga districts which still have large unoccupied spaces. Similarly, Oteng-Ababio and Melara (2014) assert that the outlying areas of the GAMA are growing more rapidly because they provide more affordable land and housing though they lack basic services. Thus, while the Accra metropolis itself has, in recent years, grown moderately as a result of lack of uninhabited spaces, the surrounding municipalities have grown rapidly as a result of the spillover of the population of the Accra Metropolis. In strict terms, therefore, the Greater Accra and Tema municipalities are not growing rapidly because

there are no lands for housing. But much of the new housing developments are taking place in nearby municipalities which are all part of the greater Accra Metropolitan Area.

The boundaries between these areas are not clear on the ground and government's own housing units for Tema and Accra are located in these other fringe municipalities.

Table 1.3 Population of Greater Accra Metropolitan Assembly, 1970 to 2010

District	1970		1984		2000		2010
	Population	Growth Rate	Population	Growth Rate	Population	Growth Rate	Population
Accra Metropolis	636,667	3.0	969,195	3.3	1,658,937	1.1	1,848,614
Ledzokuku-Krowor	-	-	-	-	-	-	227,932
Ga Municipalities*	66,336	4.9	132,786	8.9	550,468	5.0	908,053
Tema Metropolis	102,431	4.4	190,917	2.8	298,432	3.0	402,637
Ashaiman Municipal.	22,549	5.8	50,918	6.8	150,312	2.4	190,972
Adenta Municip.	-	-	-	-	-	-	78,215
Total	**827,983**	**3.5**	**1,343,816**	**3.9**	**2,501,196**	**3.8**	**3,656,423**

*Includes Ga East, Ga West, and Ga South municipal
Source. Derived from Population Census reports 1970, 1984, 2000, and 2010 (Owusu, 2013).

1.3.2 Future Projection of Urbanisation in GAMA by 2030

The populations of Accra and Tema have been projected to increase further in the next decades. The actual population growth rates will depend on a combination of factors, including natural increase and net migration which is also a result of economic opportunities in these municipalities. Based on figures in table 1.3, the growth rates of Accra and Tema will most likely decline further as there are only a few unoccupied spaces left for new estate developments. Much of the growth of the GAMA will take place in the nearby municipalities. Based on the last inter-censual growth rates of the different municipalities, the projected populations of the various municipal areas and the entire GAMA are shown in Table 1.4. The projections indicate that if the current growth trends are maintained, the population of the entire GAMA is projected to rise to about 4.7 million by the year 2020 and then 6.2 million by the year 2030. Much of the growth will occur within the Ga municipalities (i.e. Ga East, Ga West, and Ga South municipal assemblies) which may witness an increase in population from 908,053 in 2010 to 1.5 million by 2020 and nearly 2.5 million in 2030.

Table 1.4 Projected Population of Greater Accra Metropolitan area, 1970 to 2010

District	1970	2000	2010	2020	2030
	Population	Population	Population	Projected Population	Projected Population
Accra Metropolis	636,667	1,658,937	1,848,614	2,059,355	2,294,121
Ledzokuku-Krowor	-	-	227,932	253,916	282,862
Ga Municipalities*	66,336	550,468	908,053	1,498,287	2,472,174
Tema Metropolis	102,431	298,432	402,637	543,559	733,805
Ashaiman Municipal.	22,549	150,312	190,972	242,534	308,018
Adenta Municip.	-	-	78,215	99,333	126,152
Total	**827,983**	**2,501,196**	**3,656,423**	**4,696,984**	**6,217,132**

*Includes Ga East, Ga West, and Ga South municipal
Source. Derived from GSS (2012)

The population of the Accra metropolis itself is projected to rise moderately from about 1.8 million in 2010 to 2.1 million in 2020 and then 2.3 million by 2030. The Tema metropolis is also projected to experience an increase in population from about 402, 600 in 2010 to about 543,000 in 2020 and then 733, 800 in 2030. These projections imply that there will be a greater demand for housing and basic services in the entire GAMA and particularly in the Ga municipalities as well as Tema.

1.3.3. Current Household Composition and Structure of Accra and Tema

Table 1.5a and 1.5b presents the composition of households in the Accra and Tema municipal areas, based on the 2010 PHC. As shown in Table 1.5, the total household population in the Accra Metropolis in 2010 was 1,599,914, with a total number of 450,801 households. The average household size is 3.7 persons per household. The households are composed of head (28.2%), spouse (11.1%), child (35.5%) and other relative (8.5%). Thus, children constitute the largest segment of many households in

Accra. This is not surprising given the fact that the median age in Ghana is 18 years. Male-headed households are more (37.5 per cent) than female headed households (19.6 per cent) (not shown in Table).

As shown in Table 1.6, the 2010 PHC data indicates that the Tema Metropolis has a household population of 285,139 with a total number of 70,797 households. The average household size in the Metropolis is 4.1. Similar to what has been observed in the case of Accra, a majority (34.1%) of the household population of Tema are children, followed by heads (24.8 %), other relatives (11.2 %), and spouses (10.6 %). Again, similar to the situation in Accra, the proportion of households headed my men is higher (33%) than the proportion of households headed by women (17.4%) (Not shown in table). This is not surprising given what we know that patriarchal norms usually considers men as superior and for that matter household heads. Women generally only become household heads when their husbands have migrated or when the women are not in any marriage (Tanle, 2010).

Table 1.5: Household population by composition and sex (Accra)

Household composition	Total		Male		Female	
	Number	Percent	Number	Percent	Number	Percent
Total	1,599,914	100.0	764,962	100.0	834,952	100.0
Head	450,801	28.2	287,225	37.5	163,576	19.6
Spouse (wife/husband)	176,896	11.1	17,414	2.3	159,482	19.1
Child (son/daughter)	567,890	35.5	274,554	35.9	293,336	35.1
Parent/Parent in-law	11,915	0.7	2,230	0.3	9,685	1.2
Son/Daughter in-law	6,404	0.4	2,151	0.3	4,253	0.5
Grandchild	95,923	6.0	45,544	6.0	50,379	6.0
Brother/Sister	83,940	5.2	43,130	5.6	40,810	4.9
Step child	11,138	0.7	5,221	0.7	5,917	0.7
Adopted/Foster child	5,338	0.3	2,145	0.3	3,193	0.4
Other relative	136,139	8.5	59,752	7.8	76,387	9.1
Non-relative	53,530	3.3	25,596	3.3	27,934	3.3

Source: Ghana Statistical Service (2012), 2010 Population and Housing Census

Table 1.6: Household population by composition and sex (Tema)

Household composition	Total		Male		Female	
	Number	Percent	Number	Percent	Number	Percent
Total	285,139	100.0	135,914	100.0	149,225	100.0
Head	70,797	24.8	44,866	33.0	25,931	17.4
Spouse (wife/husband)	30,230	10.6	3,714	2.7	26,516	17.8
Child (son/daughter)	97,187	34.1	47,634	35.0	49,553	33.2
Parent/parent in-law	3,041	1.1	652	0.5	2,389	1.6
Son/daughter in-law	1,645	0.6	463	0.3	1,182	0.8
Grandchild	19,865	7.0	9,511	7.0	10,354	6.9
Brother/Sister	15,067	5.3	7,765	5.7	7,302	4.9
Step child	2,272	0.8	1,073	0.8	1,199	0.8
Adopted/foster child	1,014	0.4	432	0.3	582	0.4
Other relative	32,018	11.2	14,181	10.4	17,837	12.0
Non-relative	12,003	4.2	5,623	4.1	6,380	4.3

Source: Ghana Statistical Service (2012)

Table 1.7: Household population by structure and sex (Accra)

Household structure	Total		Male		Female	
	Number	Percent	Number	Percent	Number	Percent
Total	1,599,914	100.0	764,962	100.0	834,952	100.0
Head only	99,322	6.2	67,381	8.8	31,941	3.8
Head and a spouse only	46,250	2.9	23,196	3.0	23,054	2.8
Nuclear (Head spouse(s) children)	429,821	26.9	216,005	28.2	213,816	25.6
Extended (Head spouse(s) children Head's relatives)	251,706	15.7	119,444	15.6	132,262	15.8
Extended + non relatives	28,435	1.8	13,473	1.8	14,962	1.8
Head spouse(s) and other composition	65,762	4.1	31,378	4.1	34,384	4.1
Single parent Nuclear	176,357	11.0	71,005	9.3	105,352	12.6
Single parent Extended	243,190	15.2	90,526	11.8	152,664	18.3
Single parent Extended + non relative Head and other composition but no	29,756	1.9	11,451	1.5	18,305	2.2
Spouse	229,315	14.3	121,103	15.8	108,212	13.0

Source: Ghana Statistical Service, 2010 Population and Housing Census

Tables 1.7 and 1.8 also summarize the structure of households (in terms of the relationship between household members). The data shows that in the Accra Metropolis (Table 1.7), *nuclear households* (made up of Head, spouses and children) constituted the highest proportion (26.9%), followed by *extended households* (made up of Head, spouses, children and Head's relatives) (15.7%) and then single parent extended households (5.2%). Head only (i.e. single person households) constituted only 6.2 % of the total number of households in the Metropolis. The data on Tema shows similar patterns (Table 1.8) with 22.4 % of households

being nuclear family, 19.4 % being extended family households, and 16.9 % being single parent extended households. Only 4.2 % of the total number of households in the Metropolis is single person households (i.e. head only). Given that single person households are very few in both cities, the development of single room housing units which are common in developed countries may not be good for these cities. Any housing development should lead to the construction of units that have two or more rooms to accommodate the different relatives that live together.

Table 1.8: Household structure and sex (Tema)

Household structure	Total		Male Head		Female Head	
	Number	Percent	Number	Percent	Number	Percent
All	285,139	100.0	135,914	100.0	149,225	100.0
Head only	12,110	4.2	8,219	6.0	3,891	2.6
Head and a spouse only	6,622	2.3	3,330	2.5	3,292	2.2

Nuclear (head spouse(s) children)	63,769	22.4	32,013	23.6	31,756	21.3
Extended (head spouse(s) children head's relatives) '		19.4	26,389	19.4	28,962	19.4
Extended + non relatives	9,943	3.5	4,754	3.5	5,189	3.5
Head spouse(s) and other composition	15,179	5.3	7,202	5.3	7,977	5.3
Single parent nuclear	23,815	8.4	9,983	7.3	13,832	9.3
Single parent extended	48,228	16.9	19,154	14.1	29,074	19.5
Single parent extended + non relative	8,874	3.1	3,506	2.6	5,368	3.6
Head and other composition but spouse	41,248	14.5	21,364	15.7	19,884	13.3

Source: Ghana Statistical Service, 2010 Population and Housing Census

1.4 The Economic System, Structure and Development of Accra and Tema

In this section, we consider the broad economic history of Ghana before narrowing down to the two cities of Accra and Tema. Ghana after independence in 1957 has practised more of the mixed economic systems like many other economies today. Many economic decisions are taken in the market places by individuals whilst the government also plays an important role in the allocation and distribution of resources. Ghana's economy has diverse resource base. Natural resources abound in all its forms including gold, diamond, copper etc. Ghana at independence appeared stable, prosperous, was the leading producer of cocoa, boasted of a well-developed infrastructure to service trade and enjoyed a relatively advanced education system (U.S. Library of Congress), strong international reserves and strong civil service to support economic growth.

This era was followed immediately by massive industrialisation underpinned by cocoa production whose price later collapsed by mid 1960s, coupled with significant fall in the production of gold, diamond, manganese and bauxite and pluned the country into debt undermining the fundamentals of the economy and ushered in era of political and economic uncertainty. Ghana since then has had a long relationship with the International Monetary Fund (IMF) after it joined the fund on 20th September, 1957 and other Bretton Woods institutions and implemented several economic and financial reforms aimed at arresting the dwindling economic fortunes. Action Aid (2010) documents that Ghana's relationship with the IMF has at best resulted in stabilization and economic growth which, however, occurred at the expense of employment as evidenced in the era of Structural Adjustment Programmes (SAPs).

Though the IMF and World Bank supported programs have helped the country, other analysts have described the country's long marriage with the IMF as a bad one and that Ghana could have done without the IMF. But available evidence suggests the country's debt stock which stood at USD$500 million in 1965 (from a negligible amount in 1960), the external reserve position in 1957 when net reserves stood at US$269 million had deteriorated considerably in 1966 when they were negative at –US$391 million with outcome resulting in a deteriorating balance of payments position and also the poor credit rating accorded the country with inflation ballooning from 0.98 per cent in 1964 to 26.4 per cent in 1965 (see Osei-wusuAdjei, and OheneKyei, 2009 and Frimpong-Ansah, 1991). The longest relationship with the IMF occurred from 1983 to 2006 with ERP and SAP. The ERP was intended to arrest the downward economic spiral while the SAP sought to correct a number of structural imbalances to ensure a sustained healthy economic growth (Aryeetey, and Kanbur, (eds) (2008).

It is also worth noting that Ghana consciously exited the Bretton Woods when the country existed the Poverty Reduction and Growth Facility in 2006 leading to the issuance of 750 million dollar first Eurobond after it obtained a favourable credit rating but that effort was effectively undone in 2009 when the country made a U-turn for another Fund-supported program from July 2009 to July 2012 (ECF). During this period the country recorded economic stability and achieved one of the highest GDP growths (14.1%) in the World in 2011 largely as a result of the introduction of the oil and one off record cocoa production. Thus, the ECF enabled the government to steer its affairs through the difficult first two years of the political business cycle/election year effect which is more evident soon after the election. Two years on, August 2014, the government announced its major policy decision to turn to the IMF though this had long been predicted. The 2012 elections were largely characterized by fiscal slippages resulting in twin double digits deficits (current account and fiscal deficits). The structure of Ghana's economy has changed. The share of agriculture to GDP has been overtaken by both the industrial and services sectors. The services sector currently contributes the largest share to GDP (about 54%), followed by the industrial sector (25%) and the agricultural sector (20%) (GSS, 2016).

In recent times, the services sector has also assumed the role as the lead driver of growth within the economy. Until recently, the Ghana's agricultural sector persisted as the dominant sector, accounting for the largest share of foreign exchange, GDP and employment. This narrative is fast changing and reflects a structural transformation of the economy albeit with limited advantages. The agricultural sector contributes the least to GDP (20%) although it still accounts for the largest share of the employed population (GSS, 2014, 2016). Growth rate in the agricultural sector has generally been on a decline. In 2007, a negative growth rate of 1.7% was recorded. There was a strident recovery in the following year, recording a peak of 7.4% and then declining to the current rate of 2.4% in 2015 (GSS, 2016 Show graph of recent economic growth).

GDP growth over the period has been uneven. Peaking in 2011 largely as a result of introduction of oil and record cocoa production in 2011, growth decelerated sharply in the subsequent years being exacerbated by the fiscal slippages of 2012 and large current account deficit, the country approached the IMF for An Extended Credit Facility (ECF) predicated on fiscal consolidation of both revenue and expenditure adjustments. The program coincided with the energy challenges that severely imposed restrictions on the growth drivers of the economy causing growth to dwarf, thus causing the program to achieve limited effectiveness in the first one and half years of the program implementation.

Figure 1.5: Annual Real GDP Growth (Percent), 2008-2016
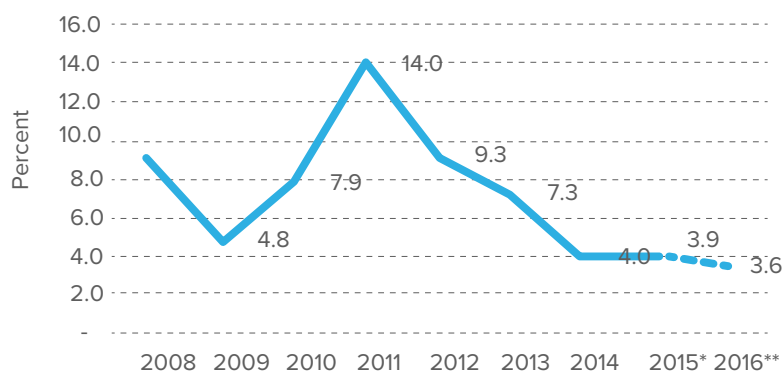
Source: Budget statement, GSS/MOF
*Revised **Provisional

1.4.1 Accra

Given its position as the regional capital of the Greater Accra Region and the national capital of the Republic of Ghana, Accra is the most economically developed city in Ghana. The local economy of the metropolis is made up industry, commerce/service and agriculture. However, the industrial and service sectors form the backbone of the economy. The Accra metropolis hosts a number of manufacturing industries, business enterprises, head offices of government ministries, financial, education,

and health institutions (AMA, 2015). The presence of these institutions provides employment opportunities to the residents of the City. The large population of Accra also provides opportunities for trading. In view of the economic opportunities it offers, Accra continues to serve as the most popular destination of migrants from within and outside Ghana (Awumbila et al, 2016). The presence of many business enterprises in Accra also contribute massively to internally generated revenue of the Accra Metropolitan Assembly in the form of business operating permit, building permit and property tax. Majority of the residents in the city are engaged in the primary,

secondary and tertiary economic activities. The indigenous people were mostly engaged in fishing and farming. Today, the AMA is not an agro-based economy due to scarcity of fertile lands resulting from high demand of lands for housing and industrial purposes. However, there are pockets of small-scale agricultural activities within the Metropolis. Most of the crop farmers produce vegetables within unoccupied spaces within the city or in the peri-urban areas. A number of the people are engaged in occupations such as trading, construction, services, manufacturing among others.

Table 1.9: Population 15 years and older by activity status and sex (Accra)

Activity status	Total	%	Male	%	Female	%
Total	**1,187,509**	**100.0**	**565,959**	**100.0**	**621,550**	**100.0**
Economically active	833,019	70.1	407,304	72.0	425,715	68.5
Employed	772,877	92.8	378,489	92.9	394,388	92.6
Worked	743,246	96.2	367,022	97.0	376,224	95.4
Did not work but had job to go back to	28,181	3.6	10,856	2.9	17,325	4.4
Did voluntary work without pay	1,450	0.2	611	0.2	839	0.2
Unemployed	60,142	7.2	28,815	7.1	31,327	7.4
Worked before, seeking work and available	25,375	42.2	11,068	38.4	14,307	45.7
Seeking work for the first time and available	34,767	57.8	17,747	61.6	17,020	54.3
Economically not active	354,490	29.9	158,655	28.0	195,835	31.5
Did home duties (household chore)	68,887	19.4	17,963	11.3	50,924	26.0
Full time education	184,244	52.0	94,382	59.5	89,862	45.9
Pensioner/Retired	24,203	6.8	14,146	8.9	10,057	5.1
Disabled/Sick	11,020	3.1	5,246	3.3	5,774	2.9
Too old/young	28,319	8.0	8,206	5.2	20,113	10.3
Other	37,817	10.7	18,712	11.8	19,105	9.8

Source: Ghana Statistical Service, 2010 Population and Housing Census

The 2010 PHC data shows that about 70.1% of the population of the Accra Metropolis aged 15 years and above are economically active while 29.9% are not economically active. The population that is not economically active is largely made up of students (52.0%), people performing unpaid household duties (19.4%) and sick or disabled persons (3.1%) (see Table 1.9). Among the economically active population, 93% are employed. As shown in Table 1.10, among the employed population, a majority (38.5%) are engaged in service and sales, followed by craft and related trade (20.1 %), while 17.2% of the employed population is engaged as managers, professionals, and

technicians. Only 1.7% of employed population is engaged is agriculture.

In relation to the sector of the economy of employment, the 2010 PHC shows a majority of workers (74%) are employed in the private informal sector, followed by the private Formal sector (16.9%) (see Table 1.11). Only 7.8% of the working population aged 15 years and above are employed by the government. A large number of the people working in the informal sector receive very low wages and are therefore unable to benefit from formal mortgage systems of housing finance (see Teye, 2015).

Table 1.10:Employed population 15 years and older by occupation and sex (Accra)

Occupation	Both sexes		Male		Female	
	Number	Percent	Number Percent		Number	Percent
Total	772,877	100.0	378,489	100.0	394,388	100.0
Managers	40,725	5.3	23,033	6.1	17,692	4.5
Professionals	61,042	7.9	38,038	10.0	23,004	5.8
Technicians and associate professionals	30,713	4.0	24,269	6.4	6,444	1.6
Clerical support workers	28,303	3.7	13,654	3.6	14,649	3.7
Service and sales workers	297,509	38.5	90,415	23.9	207,094	52.5
Skilled agricultural forestry and fishery workers	13,086	1.7	8,711	2.3	4,375	1.1
Craft and related trades workers	154,972	20.1	98,582	26.0	56,390	14.3
Plant and machine operators and assemblers	47,364	6.1	45,980	12.1	1,384	0.4
Elementary occupations	97,547	12.6	34,591	9.1	62,956	16.0
Other occupations	1,616	0.2	1,216	0.3	400	0.1

Source: Ghana Statistical Service, 2010 Population and Housing Census

Table 1.11: Employed population 15 years and older by employment sector and sex(Accra)

Employment Sector	Both sexes		Male		Female	
	Number	Percent	Number	Percent	Number	Percent
Total	772,877	100.0	378,489	100.0	394,388	100.0
Public (Government)	60,483	7.8	37,157	9.8	23,326	5.9
Private Formal	130,302	16.9	89,380	23.6	40,922	10.4
Private Informal	571,793	74	244,726	64.7	327,067	82.9
Semi-Public/Parastatal	1,231	0.2	834	0.2	397	0.1
NGOs (Local and International)	7,749	1.0	5,473	1.4	2,276	0.6
Other International Organisations	1,319	0.2	919	0.2	400	0.1

Source: Ghana Statistical Service, 2010 Population and Housing Census

The Accra Metropolis has more public facilities and social amenities than any other city of Ghana. There are many hundreds of government and private health facilities and educational institutions also in the community. The metropolisis currently being supplied by two (2) major water sources, namely WeijaWaterworks and Kpong Waterworks. According to the AMA (2015), these two waterworks supply 401,800m3 of water daily of the 532,570m3 daily demands. There is a daily short fall in supply of water of over 130,000m3. Due to the shortfall in supply, the Ghana Water Company Limited employs rationing programs which means that people do not get water flowing in their homes often. Another problem is the fact that only 31.8% of households in the city are connected to pipe for water supply (see Table 1.12). Majority of people in the municipality depend on electricity supplied by the Electricity Company of Ghana. As in other parts of Ghana, however, demand for electricity also far outstrips supply and as such many households experience erratic power supply in their homes.

Table 1.12 Main source of water of dwelling unit for drinking and other domestic purposes (Accra)

Sources of water	Total		Metropolis Total		
	Country	Region	Number	Percent	Urban
Main source of drinking water for household					
Total	5,467,054	1,036,370	501,903	100.0	100.0
Pipe-borne inside dwelling	790,493	272,766	159,701	31.8	31.8
Pipe-borne outside dwelling	1,039,667	291,107	142,303	28.4	28.4
Public tap/Standpipe	712,375	103,356	45,832	9.1	9.1
Bore-hole/Pump/Tube well	1,267,688	15,989	1,444	0.3	0.3
Protected well	321,091	7,167	839	0.2	0.2
Rain water	39,438	1,833	164	0.0	0.0
Protected spring	19,345	3,513	1,885	0.4	0.4
Bottled water	20,261	10,952	6,241	1.2	1.2

Sachet water	490,283	290,342	140,020	27.9	27.9
Tanker supply/Vendor provided	58,400	29,843	2,584	0.5	0.5
Unprotected well	112,567	2,314	145	0.0	0.0
Unprotected spring	12,222	318	14	0.0	0.0
River/Stream	502,804	4,179	262	0.1	0.1
Dugout/Pond/Lake/Dam/Canal	76,448	1,677	23	0.0	0.0
Other	3,972	1,014	446	0.1	0.1

Source: Ghana Statistical Service, 2010 population and Housing Census

Waste disposal is also a major problem confronting the City. Accra currently has a sewerage system that covers only 15% of the City, but it is in complete state of disrepair. Solid waste management in the city is not very good. The City generates about 2200 tonnes of garbage daily out of which the Assembly is able to collect 1500 tones daily. The huge backlog is reflected in chocked drains and overflowing garbage heaps (AMA, 2015). As shown in Table 1.13, about only 59.4% of households in Accra have their solid waste collected. Also, only 8.2% of households dispose liquid waste through a sewage system. The road network in Accra is better than most parts of Ghana some roads are not tarred and very difficult to use during the rainy season.

Table 1.13: Method waste disposal by households (Accra)

	Total		Metropolis Total			
Method of waste disposal	country	Region	Number	Percent	Urban	Rural
Solid waste (Total)	5,467,054	1,036,370	501,903	100.0	100.0	
Collected	785,889	502,642	298,178	59.4	59.4	-
Burned by household	584,820	134,654	13,402	2.7	2.7	-
Public dump (container)	1,299,654	266,287	156,481	31.2	31.2	-
Public dump (open space)	2,061,403	87,379	23,647	4.7	4.7	-
Dumped indiscriminately	498,868	22,123	5,408	1.1	1.1	-
Buried by household	182,615	14,003	1,412	0.3	0.3	-
Other	53,805	9,282	3,375	0.7	0.7	-
Liquid waste (Total)	5,467,054	1,036,370	501,903	100.0	100.0	
Through the sewerage system	183,169	95,188	41,000	8.2	8.2	-
Through drainage system into a gutter	594,404	191,228	135,248	26.9	26.9	
Through drainage into a pit (soak away)	167,555	55,807	20,012	4.0	4.0	-
Thrown onto the street/outside	1,538,550	127,782	33,064	6.6	6.6	-
Thrown into gutter	1,020,096	351,349	236,463	47.1	47.1	-
Thrown onto compound	1,924,986	208,821	33,436	6.7	6.7	-
Other	38,294	6,195	2,680	0.5	0.5	-

Source: Ghana Statistical Service, 2010 population and Housing Census

1.4.2 Tema

In many ways, the local economy of Tema is similar to that of Accra in terms of economic structure. As noted for Accra, the economy of the Tema metropolis is made up industry, commerce/service and agriculture. However, the industrial and service sectors constitute the backbone of the economy. As Tema was created mainly as the industrial hub of Ghana, it hosts over 500 industries that produce several goods, including clothing, food items, chemicals, furniture, petroleum products, steel and tools. Tema also houses the country's biggest harbour facilities. Tema is also a popular migrant destination in Ghana (Awumbila et al, 2016). Trade and commerce are also very important in Tema as many of the communities have market facilities (TMA 2015). As is the case of Accra, the availability of several economic enterprises in Tema contributes significantly to internally generated revenue of the Tema Metropolitan Assembly in the form of permits and property rates.

As is the case of Accra, majority of residents in the city are engaged in the primary, secondary and tertiary sectors of the economy. According to the 2010 PHC report, about 72% of the populations aged 15 years and above are economically active, of which 90.4 % are employed. About 50% of those who are not economically active are students while and 20.2 per cent perform unpaid duties at home. As in Accra, a significant of the employed (31.5%) population are engaged as service and sales workers, while 22.5% are engaged as managers, professionals, and technicians. As is the case in Accra, a majority of workers (65%) work in the private informal sector where wages are low and irregular.

The Tema Metropolis has a good supply of basic amenities than Accra. The Metropolis is largely being supplied by Kpong Waterworks. As shown in Table 1.14, about 49.4% of the households in Tema obtain pipe-borne water inside the dwelling. This is better than the situation in Accra where only 31% of households in Accra have pipe-borne water inside the dwelling.

Panoramic view over Accra Ghana © SHUTTERSTOCK/AStefanie Addo

The housing stock of Accra Metropolis is 149,689. The total number of households in these houses was 450,794 with population per house estimated at 11.1 and an average household size of 3.7. A majority (68.8%) of the housing units in Accra are compound houses, while 9.4% are separate houses and 6.6% are semi-detached houses. The government's involvement in the provision of housing is very limited. Indeed, only 4.1% of dwelling units are owned by public or government.About (36.5%) of the dwelling units in the Metropolis are owned by members of the household, while 42.1 per cent are owned by private individuals. Only 0.8% of the dwelling units is owned through mortgage schemes (GSS, 2012). There is a wide gap between supply and demand for housing. According to AMA (2015) report, only 21.4% of the estimated annual demand of housing units is produced in the Metropolis. The report further noted that "the housing needs of Accra's urban inhabitants are often restricted to sub-standard structures, unsanitary environments and squatter and slum communities". Given this situation, an efficient housing finance system will be required to produce affordable housing and an effective housing financing system.

Table 1.14: Source of water for drinking and other domestic purposes in households (Tema)

Source of water	Total Country	Region	District Number	Urban
Drinking water	**5,467,054**	**1,036,370**	**70,797**	**100.0**
Pipe-borne inside dwelling	*790,493*	*272,766*	*34,998*	*49.4*
Pipe-borne outside dwelling	*1,039,667*	*291,107*	*18,000*	*25.4*
Public tap/standpipe	*712,375*	*103,356*	*11,355*	*16.0*
Bore-hole/pump/tube well	*1,267,688*	*15,989*	*81*	*0.1*
Protected well	*321,091*	*7,167*	*83*	*0.1*
Rain water	*39,438*	*1,833*	*8*	*0.0*
Protected spring	*19,345*	*3,513*	*182*	*0.3*
Bottled water	*20,261*	*10,952*	*789*	*1.1*
Sachet water	*490,283*	*290,342*	*4,593*	*6.5*
Tanker supply/vendor provided	*58,400*	*29,843*	*433*	*0.6*
Unprotected well	*112,567*	*2,314*	*5*	*0.0*
Unprotected spring	*12,222*	*318*	*1*	*0.0*
River/stream	*502,804*	*4,179*	*13*	*0.0*
Dugout/pond/lake/dam/canal	*76,448*	*1,677*	*3*	*0.0*
Other	*3,972*	*1,014*	*253*	*0.4*

Source: Ghana Statistical Service, 2010 Population and Housing Census

A majority of people in the municipality depend on electricity supplied by the Electricity Company of Ghana. As in other parts of Ghana, however, demand for electricity far outstrips supply and as such many households experience erratic power supply in their homes. Although the road network in Tema is better than most parts of Ghana, it is quite poor when compared with other modern cities in other parts of the world. Some of the roads in the municipality are not tarred and are very bad, especially during the rainy season. Waste disposal is also a problem in Tema, though the situation is better than Accra. As shown in Table 1.15, about 56.2% of the households have their solid waste collected from their house. This figure is slightly lower than the Accra figure. However, the proportion of households that use a sewerage system to dispose liquid waste is far higher in Tema than Accra (39.5% for Tema verses 8.2% for Accra). This is not surprising given that Tema also has a better sewerage system that covers 30% of the City (in contrast with that of Accra which covers about 15%).

The housing situation in Tema is also slightly better than that of Accra, but still quite poor. The housing stock of the Tema Metropolis is 40,956. The average number of persons per house is 7.1 which is lower than the average number of persons per house in Accra (i.e 11.1). Similar to the situation in Accra, a majority (31.2%) of all dwelling units in the Metropolis are compound houses, followed by semi-detached houses (25.4%) and then separate houses (20.2 %). In terms of housing ownership, the situation is similar to Accra with 48.2 % of the dwelling units in Tema being owned by members of the household, while 33.6% are owned by private individuals. The state /government owns only 5.2% of houses. As was the case in Accra, only 1.3% of the dwelling units is purchased using mortgage facilities.

Table 1.15: Method of Wage Disposal (Tema)

Disposal method	Total		Tema Metropolis	
	Country	Region	Total	Urban
Solid Waste				
All	5,467,054	1,036,370	70,797	100
Collected	785,889	502,642	39,753	56.2
Burned by household	584,820	134,654	4,745	6.7
Public dump (container)	1,299,654	266,287	15,416	21.8
Public dump (open space)	2,061,403	87,379	7,544	10.7
Dumped indiscriminately	498,868	22,123	1,481	2.1
Buried by household	182,615	14,003	298	0.4
Other	53,805	9,282	1,560	2.2
Liquid Waste				
All	5,467,054	1,036,370	70,797	100
Through the sewerage system	183,169	95,188	27,966	39.5
Through drainage system into a gutter	594,404	191,228	9,800	13.8
Through drainage into a pit (soak away)	167,555	55,807	2,987	4.2
Thrown onto the street/outside	1,538,550	127,782	3,778	5.3
Thrown into gutter	1,020,096	351,349	18,817	26.6
Thrown onto compound	1,924,986	208,821	7,035	9.9
Other	38,294	6,195	414	0.6

Source: Ghana Statistical Service, 2010 Population and Housing Census

1.5 Jurisdictional Design/Environment (e.g. decentralization, local governance system) of Accra and Tema Municipalities

As in other towns and villages in Ghana, the governance of the cities of Accra and Tema is based on local governance or decentralized system adopted in 1988 in Ghana. The regulatory instrument (law) that controls development planning in the country is the National Development Planning System Act, 1994 Act 480 which recommends decentralized development planning system. Before the passage of this ACT, the Local Government Law (PNDC Law 207), enacted in 1988 and a subsequent Local Government Act 462 1993, designated districts and municipal assemblies within Ghana's ten regions, with non-partisan District Assembly (DA) elections every four years.

Figure 1.6: Levels of Governance in Ghana

Central Government (Ghana)	
Regional Coordinating Council	
District Assemblies	**Local Government System**
District Sub-structures	
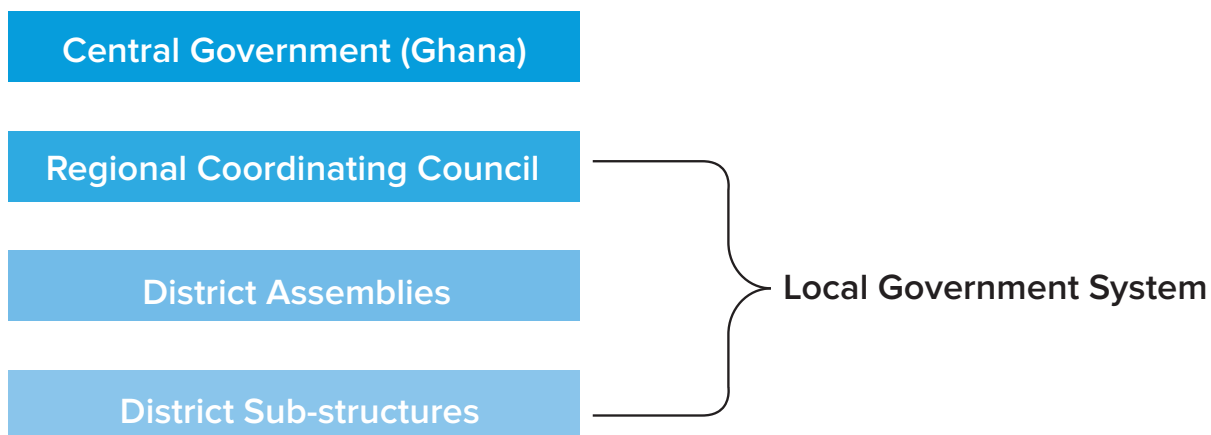
The decentralised governance structure largely falls under the Ministry of Local Government and Rural Development, with three arms representing different levels of development of the local governance units-District, Municipal and Metropolitan in ascending order (Aryee, 1994). At the base of the structure are the unit committees which constitute the lowest level of decision making. Some of the unit committee members are elected while others are appointed by the people to serve in area councils where community needs are assessed and decisions are made concerning the development of the area. The unit committee members work with the assembly men and women who are elected based on non-partisan politics and mandated to take decisions and implement them for the development of the district or municipal assembly. The political heads of the district assemblies are the District or Municipal or Metropolitan Chief Executives. A chief executive and one-third of District/municipal assembly members are appointed by the ruling government (TMA, 2015). Each Assembly has various departments headed by technocrats, civil and public servants to ensure the development and implementation of policies. The District Assemblies have been designated the planning, development and budgeting authorities. They are empowered and mandated to mobilise and manage local revenues and resources to supplement central government allocation to ensure the development of their localities (Ayee, 2014;

Teye, 2012). The district Chief Executive works with an Executive Committee which has a number of sub-committees including, Development Planning Sub-Committee, Social Services Sub-Committee, Works Sub-Committee, Education Sub-Committee, Finance & Administration Sub-Committee, Environmental Management Sub- Committee and the Revenue Mobilization Sub-Committee (TMA, 2015).

Both the Accra metropolitan Assembly (AMA) and the Tema municipal assembly (TMA) are therefore seen as local government units responsible for mobilizing resources and undertaking development projects within Accra and Tema respectively. AMA and TMA are also expected to regulate the development of housing units based on a master plan developed by the Town and Country Planning Department. However, in reality systems in place for managing land are not the same for the two cities. In the Accra metropolis, land-use is managed by the Town and Country Planning Department of the Accra Metropolitan Assembly. In contrast, the Tema Metropolis is made up of two district planning areas, namely the "Tema Acquisition Area" which is managed by Tema Development Corporation (TDC) and the "Tema Non-Acquisition Area" which is owned by the traditional authorities, and managed by the Town and Country Planning Department of the Tema Metropolitan Assembly (TMA). While TDC has effectively ensured

appropriate development of settlements in the acquisition area of Tema, the AMA is unable to strictly enforce building laws in Accra (GSS, 2013). Consequently, settlements in Tema are better well planned than settlements in Accra.

There is also enough evidence that the current local governance system is not effective for regulating the growth of these two large systems. Thus, whilelarge metropolitan areas like GAMA, need particular attention in terms of land management, planning and environmental management systems which involve the active collaboration with customary landholding institutions, the municipal assemblies in GAMA are unable to regulate the expansion of the city of Accra (Owusu and Oteng-Ababio, 2015). The two municipalities are part of the GAMA which has been fragmented several times since 1988 in response to rapid population growth (See Table 1.16). This is because instead of expanding the boundaries of the existing municipal assemblies to take care of new communities created as a result of urban sprawl, the government of Ghana usually creates new district assemblies in the new communities within the GAMA (Owusu, 2013). Consequently, between 1988 and 2003, the GAMA had 3 municipal assemblies but this was increased to 8 in 2004 and 12 since 2012 (see Table 1.16).

The inability to regulate the expansion of the city has been blamed on corruption of the part of planning officials and lack of resources to monitor and prevent illegal housing developments (Asiedu, 2016). Many estate developers in both Tema and Accra continue to build houses without acquiring any permit. There are situations whereby people have even built houses on water ways and places demarcated for public services. Thus while the existing legal framework establishes the Metropolitan and Municipal Assemblies as the main agents of urban development in Ghana, these institutions are financially and technically very weak (GoG/MLG &RD, 2010). It is in view of this that Doan and Oduro (2011) asserted that planning functions in GAMA and elsewhere in urban Ghana are severely affected by the inability of local governments to effectively regulate physical development within the various cities.

1.6 The Municipal Financial System

Ghana's financial system is centralised with the various relevant bodies including Bank of Ghana, National Insurance Commission, Securities and Exchange Commission, National Pension Regulatory Authority etc regulating different aspect of the system. Municipal and District Authorities do not operate different financial system unlike other countries with Federal systems of governance. An important component of the Structural Adjustment Programme (SAP) was the Financial Sector Adjustment Program (FINSAP). Financial Sector Reforms implemented in Ghana between 1988 and 2008 aimed at easy access to credit by the private sector through the financial sector. Although it is documented that some successes have been chalked, the private sector has largely found access to finance from the financial sector still a major challenge in their business course.

Ghana has embraced two major financial sector reforms namely Financial Sector Adjustment/Reform Programme (both FINSAP I & II) from 1988-2000 and the Financial Sector Strategic Plan (FINSSIP) from 2001 to 2008. FINSAP has led to enhancing the soundness and competiveness of mainstream banking system through an improved regulatory and supervisory framework, restructured and capitalised distressed banks; deregulated interest rates, developed capital market, and allowed massive entry of foreign banks among others,the establishment of the Ghana stock exchange, Banking Act 1989, Bank of Ghana Law 1992, PNDCL 291, Securities Industry Law 1993, PNDCL 333, NBFI Law 1999, PNDCL 328. The Financial Sector Strategic Plan (FINSSIP) also ushered in Bank of Ghana Act 2002, Universal Banking, Abolishing Secondary Reserve Requirements, Banking Act 2004, Banking Amendment Act 2007 – Offshore Banking, Long Term Savings Act 2004, Venture Capital Trust Fund Act 2004, Payment System Act 2003, Credit Reporting Act 2008, Licensing of first Credit Reference Bureau, Establishment of a Collateral Registry, Borrowers and Lenders Act 2008, Insolvency Act 2003, Home Finance Act 2008, Non-Bank Financial Institutions Act 2008, Central Securities Depository Act 2007.

Notable recent developments in the industry include the specialised deposit taking institutions bill and the deposit protection bill which were passed in July 2016. The Bank of Ghana Act has been revised increasing the zero financing of budget deficit prescribed by the IMF to 5%. Ghana's financial system is characterised by formal institutions co-existing alongside, semi-formal and informal traditional institutions with very little linkages.

The conventional formal banking sector has experienced some tremendous growth both in number and expansion of branch network resulting in some measured competitions since the FINSAP. For example, the number of number of banks has increased from 9 at the time of the reforms to 30 (with about 1100 branch networks) as at the end of 2015. In addition to this are the Rural and Community banks (RCBs). Mobile money currently presents uneasy terrain for a number of the banks and other financial institutions. The RCBs have the main objective of bringing the rural population into mainstream banking system under rules designed to suit their socio-economic circumstances and the peculiarities of their occupation in farming and micro-enterprise activities (Osei-Assibey et al, 2012). Together with their branches, the RCBs constitute the largest banking network in rural Ghana, now numbering 129 units with more than 486 branches scattered across all the 10 regions of the country (Ibid). This notwithstanding, World Bank (2008) indicates that the formal banking sector in Ghana reaches just about 5 per cent of the population and even much less for the smaller enterprises with Mensah (2004) attributing this low use of formal finance in the country to the relatively undeveloped financial sector with low levels of intermediation, lack of institutional and legal structures that facilitate the management of small enterprise lending risk, high cost of borrowing and rigidities in interest rates. The Semi-Formal Finance **mainly belongs to the non-bank financial institutions (NBFIs) that are registered under the NBFI Acts 2008.**

Table 1.16 **Number of Metropolitan and Municipal District Assemblies (MMDAs) in the Greater Accra Metropolitan Area (GAMA), 1988 to 2012**

Period	Number of MMDAs	Name of MMDAs
1988-2003	3	Accra Metropolitan; Tema Municipal; Ga District
2004-2007	4	Accra Metropolitan; Tema Municipal; Ga West Municipal; Ga East Municipal
2008-2011	8	Accra Metropolitan; Tema Municipal; Ga West Municipal; Ga East Municipal; Ga South Municipal; Adenta Municipal; Ashaiman Municipal; Ledzokuku-Krowor Municipal
2012-to date	12	Accra Metropolitan; Tema Municipal; GaWest Municipal; Ga East Municipal; Ga South Municipal; Ga Central Municipal; Adenta Municipal; Ashaiman Municipal; Ledzokuku-Krowor Municipal; La Dade-Kotopon Municipal; La-Nkwantanang-Madina Municipal; KponeKatamanso Municipal

Figure 1.6 **The Structure of Financing Sources within the RFM in Ghana**
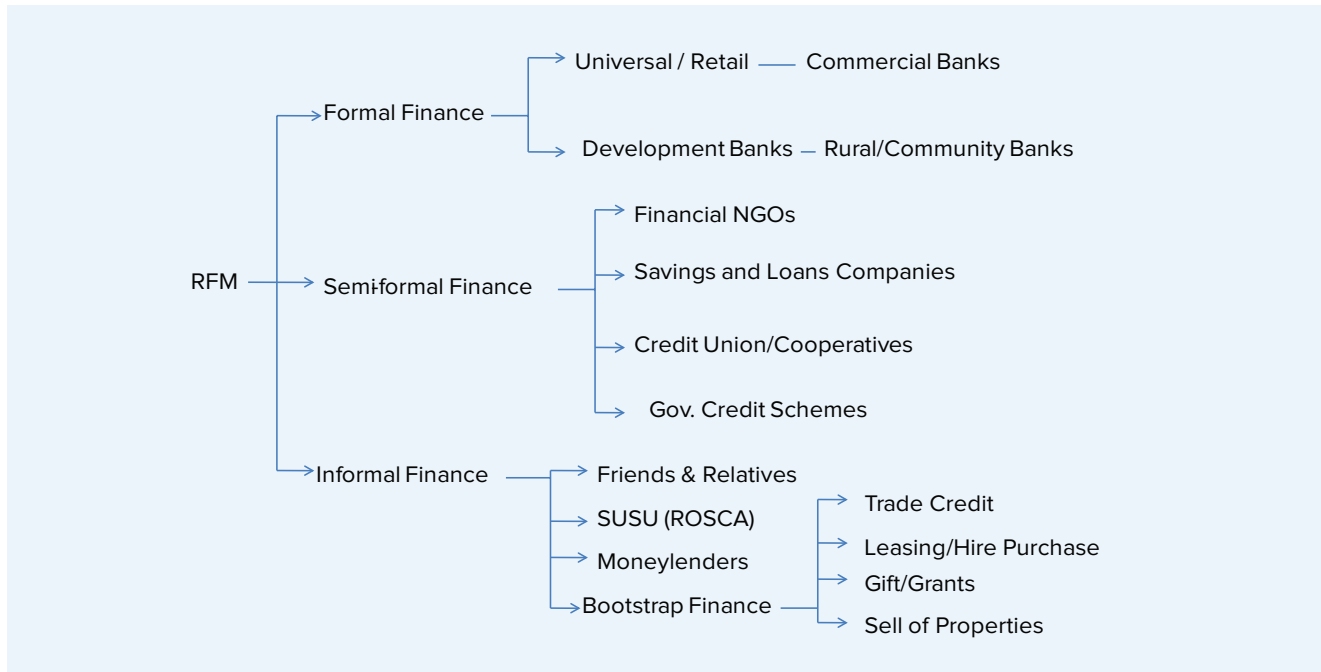
Source: Osei-Assibey et al, 2012

There are about nine categories of financial institutions under the NBFIs. Among them are the Savings and Loans Companies, Credit Unions and some specialised MFIs, which even though are restricted to a limited range of services, are most active in micro and small-scale enterprise financing. The informal financial institutions embodies an array of financial institutions that are largely not regulated and fall outside all the banking laws of Ghana including money lenders, pawnshops, SUSU etc. The following diagram shows the rural financial system.

1.7 Municipal Revenue and Expenditure by Categories/Types

An assessment of the composite budgets of both the AMA and TMA reveals that there are similar sources of revenue and similar items of expenditure for both assemblies. In terms of revenue generation, the government still significantly supports these municipal assemblies that have opportunities to generate revenue. The recent audited revenue sources of the AMA are shown in Table 1.17. About 47.9%

of the GHC 38,997,301 total revenue generated in the year 2011 was grants or transfers from the government. Apart from these grants, other major revenue sources for the two municipal assemblies as well as district assemblies in Ghana are Rates; Lands; Fees, Charges and Fines; Licenses, Rent and Investment Income. It is clear from the Table that of these sources of internally generated revenue, fees,charges & fines are very important, followed by licences and then rates.

Revenue generation situation in Tema is similar to that of Accra. For instance, a TMA (2013) report shows that for the year 2012, total revenue collected amounted to about GH 17,366,828 (USD 4, 341,707). Of this amount, the Government of Ghana (GoG) grants and transfers was GH 9,071,345, constituting 52.23% of total revenue. Of the total grants received, 11.7% or GH 1,057,639 was the District Assemblies Common Fund (DACF). Actual Internally Generated Revenue (IGR) collected for the period was GH 8,295,482 or 47.8% of total revenue. A breakdown of sources of internally generated revenue for Tema for selected years is shown in Table 1.18.

The internally generated revenue sources are similar to that of Accra with fees, licenses and rates being very important sources. It must be noted that rent is not a major source of revenue for both Accra and Tema and this is due to the fact that the state's involvement in estate development is limited.

In terms of expenditure, only a small proportion of the two municipal assemblies' revenue is spent on capital development projects. Most development projects in the municipalities (e.g. water provision, housing, road infrastructure) are undertaken with donor grants to the Central government. As shown in Table 1.19 for AMA, of the GHC 31,050,231.98 total expenditure

of the AMA in 2011, only 17% was for capital expenditure. Recurrent expenditure was very high. Personal emoluments alone constituted almost 24% of the expenditure, while almost 43% of the expenditure was classified as miscellaneous. Only 4% of the expenditure went to maintenance and repairs. This explains the bad state of many public facilities in Accra. The expenditure data of Tema (Table 1.20) shows that in most of the years about 60% of expenditure went to recurrent expenditure with the remaining being used for capital expenditure. The situation in the TMA is better than AMA. The amount used for maintenance is however quite low also for Tema.

Table 1.17: Revenue Performances

NO	ITEM	BUDGETED GHC	ACTUAL GHC
1	Rates	5,230,660.00	5,035,000.45
2	Lands	355,000.00	315,020.12
3	Fees,charges& fines	7,522,482.00	6,708,749.67
4	Licences	6,211,520.00	5,541,371.30
5	Rent	2,797,600.00	2,236,207.64
6	Grant	19,548,500.00	18,674,109.23
7	Investment income	16,000.00	14,956.00
8	Miscellaneous		471,887.35
	Total	**41,681,762.00**	**38,997,301.76**

Source: Accra Metropolitan Assembly (2011)

1.8 Financing Sources and Flows for Housing, Infrastructure and Urban Services (Accra and Tema)

It should be clear from the presentation in section 1.7 that financing sources for infrastructure andurban services (e.g. transport, energy and power, water and waste management) largely do not come from the municipal assemblies. Like all the district assemblies in Ghana, the AMA and TMA are unable to mobilize adequate revenue for infrastructural development and provision of urban services. They therefore depend heavily on the central government's grants which are disbursed to them to fund most of their projects.

Consequently, the central government dictates the development pace of district and municipal assemblies. The decentralized system in Ghana has therefore been described as 'centralized decentralization' because apart from appointing the district chief executive, the central government funds development projects of municipalities.

However, in view of the weak financial position of the central government, it also largely depends on grants from donor countries and

international organizations to raise money for urban infrastructure. Consequently the flow of funds from the central government to municipal assemblies is not very reliable. In some cases infrastructure projects like roads, schools and hospitals take several years to complete because of lack of funds. The District assemblies also always need to get authorization from the central government before they can award contracts for development projects.

Table 1.18 Summary of Internally Generated Revenue Performance, 2011-2013 (June) (TMA)

ITEM	2011			2012			2013 (June)		
	BUDGET	ACTUAL	%	BUDGET	ACTUAL	%	BUDGET	ACTUAL	%
Rates	2,158,000	1,752,683	81.20	2,895,066	2,076,804.86	71.70	3,900,000	639,519.13	16.40
Lands	120,000	235,500	196.3	430,000	429,171.77	99.80	50,000	-	-
Fees &Fines	3,495,700	3,342,756	95.62	3,641,800	2,912,217.64	79.96	4,374,000	2,379,013.89	54.40
Licence(bop)	3,003,467	2,808,787	93.50	3,092,970	2,609,389.04	84.40	4,432,850	1,528,967.51	34.50
Rents	15,500	9,230	59.54	21,145	6,249.17	29.60	26,000	2,793.31	10.74
Investments	20,000	18,003	90.00	25,000	9,764.08	39.05	25,000	-	-
Miscellaneous	140,100	117,817	84.10	319,000	251,886.36	78.96	237,690	454,693.21	191.30
Total	8,952,767	8,284,776	92.53	10,424,981	8,295,482	79.60	13,045,540	5,004,987	38.40

Source:TMA, 2015

Table 1.19: Expenditure for Accra metropolitan Assembly (AMA) 2011

NO	ITEM	BUDGETED GHC	ACTUAL GHC
1	Personal emoluments	8,269,366.00	7,420,108.17
2	Travelling & transport	2,941,000.00	2,338,007.45
3	General expenses	2,199,051.00	1,475,479.98
4	Maintenance, repairs & renewals	4,511,200.00	1,297,680.07
5	Miscellaneous	16,342,406.00	13,207,186.44
6	Grants and subventions	6,550.00	5,500.00
7	Capital expenditure	7,412,189	5,306,269.87
	Total	41,681,762.00	31,050,231.98

Table 1.20: Summary of Expenditure Performance, 2011-2013 (June)

ITEM	2011			2012			2013 (June)		
	BUDGET	ACTUAL	%	BUDGET	ACTUAL	%	BUDGET	ACTUAL	%
Personal Emoluments	5,243,671.00	4,378.380.31	83.50	5,333,445.00	4,649,468.74	87.20	9,561,169	3,861,839	40.40
Travelling and Transport	1,558,911.00	1,559,328.15	100.30	2,059,378.80	1,773,181.43	86.10	2,367,167	469,946	19.90
General Expenditure	1,449,200.00	1,411,751.84	97.40	1,854,558.98	1,592,859.87	85.90	2,511,541	1,909,877	76.04
Maintenance, repairs and Renewals	467,300.00	490,509.21	104.96	659,601.63	520,394.85	78.89	1,510,719	318,714	21.09
Miscellaneous Expenditure	1,315,515.00	1,195,242.41	90.85	1,487,845.54	1,283,718.25	86.20	1,930,104	97,457	5.04
Capital Expenditure	11,976,843.26	8,509,917.99	71.05	10,873,127.84	6,393,692.31	58.80	15,731,699	2,100,010	13.34
Total	**22,014,440**	**17,545,129**	**79.70**	**22,267,957**	**16,213,315.45**	**72.81**	**33,611,859**	**8,757,843**	**26.1**

Apart from the central government, the private sector and NGOs also sometimes provide funds for infrastructure and urban services. For instance, there has been private sector participation in the energy sector in recent years as a result of liberalization of the sector. Attempts to liberalize the distribution of water have, however, not improved the flow of financial resources into the sector. One area where the private sector has been highly involved in funding of infrastructure is housing. However, the mortgage market is not highly developed due to both supply and demand constraints (see Taye, 2015).

Chapter 2

Financing Needs and Status for Housing, Infrastructure and Urban Services

21 Introduction

The purpose of this chapter is to highlight and discuss the state and financing needs of housing, infrastructure and urban services in Accra and Tema. We do this both from the perspective of residents and also from the perspective of experts and city authorities. Accra is the national capital and the seat of government and all government ministries and agencies are headquartered there. Several local and multinational companies also have their headquarters in either Accra or Tema and the two cities are host to a significant number of modern and post-independence factories. In addition, Accra has the only international airport in the country while Tema hosts one of the two international sea ports in the country. The population of Accra and Tema is estimated to be 4.3million based on official estimates as at September 2016 (GSS, 2016). The two cities have the highest literacy rate in Ghana with a literacy rate of over 80% and are the most urbanised areas in Ghana (GLSS6, 2014). An important characteristic of the two cities is that a majority of their residents are migrants who are in search of better living conditions. This character coupled with high levels of urbanisation has made the two cities to be plagued with the socio-economic challenges that are common with urbanisation such as housing, social and economic infrastructure and sanitation. In our quest to find solutions to these problems, it is important to understand the underlying factors first from the perspective of the people who live there and then from the perspective of experts and city officials. This is the focus of this chapter.

Urbanization is widely acknowledged as a key driver of the global economy (ICLEI, 2015). It serves as a strong indicator of all aspects of productivity growth over long periods (Zhang, 2016). The phenomenon of urbanisation has come a long way in the last century. For example urbanization in developing countries was 17.5% in the middle of the 20th century. This increased to 40% at the dawn of the 21st century and conventional estimates predict that 93% of future growth in global urban population would occur in Asia, Africa and Latin America. 32.5% of this increase is expected to occur in Africa. Meanwhile, 39.8% of Africa's

The phenomenon of urbanisation developing countriesin the last century

17.5% in the middle of the 20th century

40% at the dawn of the 21st century

39.8% of Africa's population currently lives in urban areas and this is projected to reach **54%** in **2050.**

population currently lives in urban areas and this is projected to reach 54% in 2050. In Ghana the level of urbanization is 51% - which is higher than the average for developing countries and for Africa (GLSS6, 2014). This means that urban areas are important to developing countries and the global community as a whole and for Ghana in particular (ICLEI, 2015). Three themes which are crucial for the sustainability of urbanisation are our focus; viz. housing, infrastructure and urban services. We seek to present the state of these themes objectively and to afford the reader the chance to see in their minds eye a picture of what pertains on the field.

2.1.1 Methodology

We employ survey methodology to collect data for this chapter. This method was considered the most appropriate for this study because, data on Ghana's housing sector is scanty and are often very old. Our preliminary search showed that, a good number of reports that were available on this sector were not based on structured studies. The survey method was useful in obtaining primary data for the sector. A field survey was therefore conducted through the administration of 225 structured questionnaires in August 2016. Though the team had planned to administer as many questionnaires as possible, many people were reluctant to receive the questionnaires; 225 received them eventually. The questionnaires were administered by research assistants who had master's degrees or were graduate research assistants from the University of Ghana. The sample was selected randomly from adult residents in Accra and Tema. The survey instrument was administered to respondents at various locations including respondents' homes, offices, religious places, etc. They were self-administered and the instrument was organized into six sections. Each section was designed to obtain responses that would give indication of the current state of affairs as well as of what might be the case in the future. To ensure that responses were reliable, respondents were allowed enough time, between one and 3 days, to complete the questionnaires before collection. This was particularly the case for the respondents who were encountered at their workplaces. The discussion in this chapter highlights the survey findings based on 137 questionnaires that were retrieved. In addition to the survey which presents the opinions of residents, we also interviewed city officials in Accra and Tema and players in the real estate industry in Accra. Specifically, we interviewed officials from the Ghana Real Estate Developers Association, managers in real estate companies and Ghana Home Loans, the only company whose core business is mortgage finance.

2.1.2 Profile of Survey Respondents

Survey respondents were 58.1% male and 41.9% female and 82.2% of them had a tertiary education as illustrated in Figures 2.1, and 2.4. This means that the literacy levels in Accra and Tema is high compared to the national average. This finding is consistent with official estimates by the national statistics department (GLSS6, 2014). The remainder had educational levels other than tertiary. The sample was largely youthful with 94.7% being below 40. This is shown in Table 2.1. From Table 2.2, 79.7% of the respondents were not married and 20.3% were married or living with a partner. About eleven people in every hundred (11.3%) in the sample indicated that they were unemployed. The remaining 77.4% who indicated that they were in some form of employment indicated that; they either had a full-time or part-time employment. Some of the full and part-time employed workers also had a business they managed in addition to their employment. This is a common phenomenon in Ghana. The employment data is shown in Figure 2.5. The monthly incomes of six out of every 10 people (60%) were less than GHC2000 (equivalent to about $500, see Figure 2.7). This puts a majority of our sample in the low-income bracket using the definition of AfDB, the African Development Bank (cite). The definitions by the Ghana Statistical Service will only include a quarter of them as being in the low-income brackets and 35% as being in the lower middle-income bracket. The remainder of the sample indicated that they were either self-employed on a full-timebases or that they combined some form of private business venture with an employment in another firm. This is shown in Figure 2.5. Figure 2.6 shows the distribution of the sample based on the sector of the economy in which they were employed.

Table 2.1: Gender of Respondents

Gender	Respondents (%)
Male	58.1
Female	41.9

Source: Survey Data, 2016

Table 2.2: Marital Status of Respondents

	Respondents (%)
Single	79.7
Married/Living with a partner	18.8
Divorced/ separated/widowed	1.5

Source: Survey Data, 2016

75% of respondents indicated that they were employed in the service sector. This is not surprising as the annual reports on the Ghanaian economy have consistently shown that the service sector is the largest and fastest growing sector of the economy (SGER, 2016; World Bank, 2015). The other quarter were employed in the trade, agriculture and construction sectors. Overall, we find that the characteristics of the selected sample are similar to that obtained from the Ghana Statistical Service. This means that the sample selected is representative of the target population and is appropriate to provide the needed information.

2.1.3 Housing Profile

Official estimates have it that the average size of households in the Greater Accra Region is about 3.8 persons (GLSS6, 2014). Using our sample we estimate that the average size of households have risen to 4.9 persons per household. This is reflected in the increasing population of Accra as reported by recent national estimates (GSS, 2016). Figure 2.8 shows the range of sizes of households. It is clear that a significant proportion of households in our sample have a size of more than five. These households lived in

dwelling units such as flats, terraced houses, semi-detached and detached houses which are mainly constructed using cement blocks (Figure 2.20). More than three households in every ten lived in a detached housing unit while about a quarter lived in flats. A few lived in other forms of housing. This is shown in figure 2.13. However, most households live in housing units that had between one bedroom, commonly called "chamber and hall" and three bedroom or a single room but these are mostly en-suite (locally referred to as self-contained). Young couples and those with low-income levels are among those who typically patronize chamber and hall apartments in Ghana. The result in figure 2.11 shows that there are more houses with more than three bedrooms than any form of housing.

A majority of the respondents reported that their housing units were older than 10 years and a majority of these respondents have been resident in their current dwelling for longer than a decade (Figure 2.10). That notwithstanding, we shall show later that many of the residents feel their current dwelling is not adequate for their needs hence need alternative housing but are unable to afford their preferred housing type. Our results in Figure 2.9 show that only a few new houses exist in Accra and Tema. It can therefore be inferred that the rate of addition to the stock of housing in the two cities is slow. It is not obvious from that chart what might be the reason for this trend. We however explain this to be as a result of lack of financial capacity of most residents. This can be seen from earlier discussions as income levels are generally low for a significant majority of the respondents.

Figure 2.1: Age of Respondents
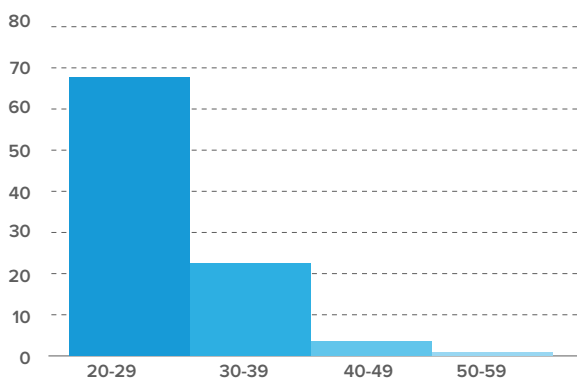
Source: Survey Data, 2017

Previously, state agencies were actively involved in providing housing to residents. These were mostly in the form of flats and bungalows for civil servants and were considered affordable or "low cost" houses. The proportion of housing units that were found to be either flats or bungalows is about 41.1%. It is therefore likely that these old housing units stillconstitute a significant part of the housing stock of the two cities; an assertion which is backed by the fact that many existing housing units in the two cities are old, as in an earlier figure 2.9. Tema is one city that has many of such housing units because the Tema Development Cooperation (TDC), a state entity, used to almost be the sole provider of modern housing in the city in the past. In the last decade however, private home ownership in the two cites has picked up and this can be seen from figure 2.9.

An Estate in Accra, © ghanafind.com

2.2 Financing Needs for Low and Lower-Middle Income Housing

2.2.1 Who are they and what are their needs?

We have already established in previous sections that a significant proportion of the residents in Accra and Tema are in the low and lower-middle income brackets. It is important to explore the housing finance needs of the low and middle-income segment of the economy. The most recent Ghana Living Standards Survey, GLSS6, conducted in 2013 (GSS, 2014) set a poverty line of GHC1314 ($328.5). Using our survey results we can take it that about 60% of the respondents to the survey are within the low and middle-income brackets (Figure 2.7). However, everywhere in the world the issue of housing touches the heart of everyone irrespective of their life circumstances. While housing has been considered to be a serious challenge to most countries around the world, it is particularly severe among developing countries, especially those in Africa (Wakely, 2014; Okeyinka, 2014). The situation is not different in the cities of Accra and Tema (GSS, 2016).

2.2.2 Estimation of Housing Needs for Accra and Tema

The concept of housing need has different facets and any attempt at estimating it must clearly specify the king of need of interest. Bramley et al (2010) identify four main categories of housing need outlined below:

- Lack of own secure tenure, which includes the homeless, households with insecure tenures and unaffordable accommodation.

- Mismatch/unsuitable housing, encompassing overcrowding, sharing of basic amenities and under-utilization of housing (i.e. households occupying excessively large houses than required).

- Poor housing condition, including those lacking basic amenities such as kitchen, bath, toilets etc.

- Lack of social housing for vulnerable groups such as persons with disabilities and the aged.

Several models exist to estimate housing need but the appropriateness or otherwise of a model should be assessed on the basis of data availability. For a developing country such as Ghana, where access to reliable data remains a big problem, the use of more sophisticated models of estimating needs will be impractical. As a result, we rely on a largely demographic data-based model in estimating the housing needs for Accra and Tema. A major constraint in this analysis is the lack of more recent data. The most recent population and housing survey in Ghana is the 2010 census and even though the Ghana Statistical Service (GSS) has released projected population numbers up to 2016, no such update or official projection exist for the stock of housing at both the national and local levels. More so, projected population figures are only for the national and regional levels. Another data source we rely on is the Ghana Living Standards Survey (GLSS), which was last published in 2014. The

GLSS report, even though is more recent, is not as comprehensive as census surveys with the Greater Accra Metropolitan area (GAMA) being the lowest level for which data is presented. Notwithstanding the data limitation, we make the best use of the data available to provide fairly reliable estimates of the housing need.

As a start, we use figures reported in the 2014 National Housing Policy (NHP) document to provide deduce the housing need for the two cities. Nationally, the housing deficit as at 2010 was estimated at 2.5 million rooms and the NHP estimates that to clear this deficit and provide for new households, the country would need 5.7 million rooms by 2020 implying an annual need of about 570,000 rooms. Given an average household size of about 4 persons and an occupancy threshold of two persons per room, two to three bedroom units would seem to be the appropriate housing unit sizes. At two bedrooms per unit, a total of about 285,000 housing units would be required annually nationwide. There is no officially available geographical distribution of this need. However, using the GSS estimate that the population of the two cities is about of 8% of the national population, we estimate annual housing need of about 22,800 units. This may be an underestimation since the deficit figures may have worsened since 2010. In the paragraphs that follow, we use city-level census data to provide an alternative estimation of the housing need.

One of the major drivers of demand for housing is household formation, which in turn is influenced by factors such as growth in population, age structure and rate of household incidence (Miller, 1988). Table 2.3 presents the summary of the population, number of households and housing stock for Accra and Tema based on the 2010 census (the only data source for which such information exists for both cities).

Table 2.3: Population, Households and Housing Stock for Accra and Tema for 2010

Description	Accra	Tema
Households	450,748	70,797
Total Population	1,665,086	292,773
% adult population	71.32%	70.65%
Adult population	1,187,539	206,840
Headship rate	0.38	0.34
Stock of Houses	149,689	40,956
Households per House	3	2
Dwelling units	524,516	73,283
Proportion of Region's population	41.5%	7.3%

Table 2.4: Projected Population and Number of Households for Accra and Tema

Description	Accra	Tema
Households	518,593	81,455
Total Population	1,915,710	336,840
% adult population	71.32%	70.65%
Adult population	1,366,285	237,978
Headship rate	0.38	0.34

The total number of households as at 2010 was 450,748 and 70,797 for Accra and Tema respectively constituting 8.2% and 1.3% of total households nationwide. It is instructive to note that even though Accra's population represents only about 6.8% of the national population, its number of households represent 8.2% of the national figure suggesting a higher household incidence rate. In fact, this observation is collaborated by a headship rate of 38% for Accra compared to the average rate of 36% nationally. However, the headship rate for Tema, which was 34%, is below the national rate. Using the GSS projected regional population figures for 2016 for Greater Accra Region and holding the headship rate constant at the 2010 levels, we are able to project the number of households for the two cities. The projections are premised on the assumption that the cities' share of the total population of the region which stood at 42% and 7% as at 2010 for Accra and Tema respectively has not changed over the past six years. The estimated number of households for Accra and Tema, reported in Table 2.4, is 518,593 and 81,455 respectively as at 2016.

The evidence from the 2010 census and the Ghana Living Standards Survey (2014) show that needs arising from overcrowding and poor housing conditions are the two main categories of need prevalent in the two cities. However, as rightly noted by Bramley et al (2010), addressing the problems of poor housing condition would require an upgrade of the existing units and communities. Since the current study is not envisaged to deal with issues such as slum upgrade, this form of need is ignored in our estimates. Consequently, the housing need analysis focuses on overcrowding.

According to the 2010 census, only about 9% and 6.5% of the number of households in Accra and Tema comprise of one or two members. At an occupancy threshold of 2 persons per room as specified in the Zoning and Planning Standards (2011), one should expect no more than 10% of dwelling units to comprise of a single sleeping room in the two cities. However, the census reports that about 51% and 54% of households occupy single rooms in Accra and Tema. Of the 54% of households in Tema who occupy single rooms, 52% are households with

three or more members when such households would require at least two sleeping rooms. The situation in Accra is quite similar to what pertains in Tema with about 47% of single room occupants being three or more member households. Extending this analysis across the different room occupancies, we determine that about 37% and 43% of households in Accra and Tema live in overcrowded dwelling units.

Applying these overcrowded rates to the estimated number of households in 2016 imply that about 191,879 and 35,026 dwelling units comprising of at least two bedrooms would be required to solve the overcrowding problems in both cities. Of course, these estimates are the upper limit of the need arising out of overcrowding as it may be possible to decongest the existing housing stock to allow for more rooms for large-sized households. Thus, the number of new dwelling units required to eliminate overcrowding would range between 95,939 and 191,879 for Accra and 17,513 and 35,026 for Tema depending on whether existing units are in habitable condition for continuous occupation. It must be stressed that the need derived above only addressed the backlog and does not include future need arising out of growth in the number of households.

Analysis of census data over the period 1960 – 2010 reveals that on average, the number of households has increased at an annual rate of 4% for the Greater Accra Region area. However, anecdotal evidence and population trends within the region point to the fact that a greater share of population growth and therefore new households are more likely to settle in adjoining districts outside of these two big cities. As a result, an annual growth rate of 2.4% is considered reasonable for the two cities to account for general increases in population. Applying this rate to the estimated number of households as at 2016 would suggest that at least 12,446 and 1,954 new households will need to be housed every year in Accra and Tema respectively.

For the purposes of estimating the financing needs of housing for the two cities, we use the upper limit figures on the assumption that most of these overcrowded units may be not be in

very good condition and it may make more sense to provide a complete replacement. Thus, we estimate the annual need for the two cities to be about 37,100 units over the next decade

2.2.3 Financing Needs for Low Income Housing

Globalization and urbanization has been driven largely by economic growth in the last three decades and has in turn enhanced economic growth (ICLEI, 2015). Growth in Africa has risen steadily over the period at about 4.5% with many countries in sub-Saharan Africa growing beyond 7%. Notwithstanding the persistence of economic growth, there is still considerable increase in income inequality in Africa (Ghana Gini = 42.3%; increasing by 1.4 points since GLSS5). The World Bank estimated that the incidence of extreme poverty in Africa declined to about 43% in 2012 from 57% in 1990. This seems to be good news but it is only partially so as inequality has deepened across the continent. Thus regardless of economic growth the demand for informal urban housing has not reduced. This is also partly due to population growth, increasing cost of living and growth of the informal sector in developing countries. Informal sector workers often constitute the low-income bracket in Africa (Cite).

Though Ghana has experienced continuous economic growth, the informal sector has continued to expand. It is estimated that the informal sector in Ghana employs about 86.1% of the country's labor force (GLSS, 2014). The sector includes people engaged in farming, small scale agro-processing, mineral extraction and trading. The urban informal sector is dominated by trading and small scale agro-processing. The workers in the sector are usually migrants from rural areas who have left many dependents behind and so they send a big portion of their income back home as remittances. The sector is also characterized by people with educational levels usually ranging from secondary education and lower. They usually have low wages, low access to quality health care and live in slums, compound houses or temporary structures. They have

The World Bank estimated that the incidence of extreme poverty in Africa declined to about

43%
in **2012** from

57%
in **1990**

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Workersbuilding houses in Accra city, Ghana © SHUTTERSTOCK/Gerhard Pettersson

low savings and so are unable to attract loans and other financial products. They are thus financially excluded; that is they are isolated from the formal financial sector and have low access to products from the banks and mortgage companies. Even for the educated, many can be considered to be low-income earners. This is evident from our finding which shows that a significant proportion of residents in (25% of our survey respondents, Figure 2.7) our sample are low income earners. The financial services that are usually open to them are those offered by the microfinance sector and they are characterized by high interest rates- up to 80%.

Microfinance companies usually offer short term loans and yet do not offer loan amounts that are sufficient to pay for even the cheapest homes in urban areas. According to the GLSS6, this has left the low-income brackets in urban areas to become predominantly tenants in

rented single (44.5%) and chamber and hall room (24.8%) facilities. Some of these housing units lack some basic facilities such as water, bathrooms (71.9% either have none, shared among tenants or use public bathrooms) and toilet facilities (19.3% have none). 13.4% of our respondents indicated that they lived in a single room while 19.4% said they lived in a chamber and hall (Figure 2.11). 82% however mentioned that the facilities in their dwelling were private other than shared (Figure 2.12).

Several decades ago, the poor often settled on vacant lands in the city, disregarding land ownership and city building regulations. This option is no longer accessible as city authorities have begun to enforce strict building regulations and land owners are hiring "land guards" to police their lands. Others have put up walls around their lands to keep encroachers away. These developments have made informal housing inaccessible to the

poor thus accentuating the housing gap. The 2000 housing and population census in Ghana showed that there were about 3.88 million dwelling units in Ghana with only about half being classified as houses. The remainder are poor quality structures including mud houses, kiosks, and tents, attachments to shops and offices and containers located in urban areas, mostly in the cities. The 2010 census showed a 50% increase in the number of dwelling units to 5.81 million with 3.39 million classified as houses. This represents a significant growth in informal housing/dwelling units. It shows further that low income residents are having fewer houses or that that category is growing. There has been an increase in the number of housing units of 64.9% over the previous 10 years. 51.5% of all housing units in the country are compound houses occupied by 60.6% (63.9% in Accra and Tema) of households; mostly rental tenants with Greater Accra accounting for the highest proportion or rental housing units (47.1%).

The 2010 housing and population census also indicated that 50.9% of Ghana's population lives in urban areas. Greater Accra region is the most urbanized region at 90.5% with Accra and Tema both in the greater Accra region being the most populated areas. Furthermore the proportion of makeshift dwelling units is largest in greater Accra at 6.2% and less than 1% in other regions. The GLSS6 indicates that 3.6% of households in Accra live in impoverished housing units; a figure which is significantly higher for other urban areas. The foregoing strongly suggests that while there is an overall shortage of housing and particularly so in the Greater Accra, the situation is rather acute for low income earners. We proceed to present analysis of how much is required to meet this need and the specific interventions that will be useful for ameliorating the challenge.

First of all, to meet the housing needs of the urban poor, it is important to increase access to urban land; something that requires planning by urban authorities and government intervention. This will be difficult to achieve as most governments favor free-market policies and are unwilling to intervene in land markets. Lands in most parts of Accra and Tema sell for between $5000 (GHC20,000) and $100,000

(GHC400,000). The Ghana Living Standards Survey round 6 (GLSS6) estimated that about a quarter of Ghanaians are below the upper poverty line of GH1314 per adult per year. More than a quarter of our survey respondents are below that line (Figure 2.7). Thus it will take the average low–income earner (or the poor) 15.22 years to own a piece of urban land if they forgo all consumption.

As part of the real estate boom in Ghana in the last decade, real estate firms and companies have patronized modern advertising measures such as the internet and radio to reach customers. A search on two of the largest internet market places in Ghana, olx.com and tonaton.com, on house prices generated 2,462 items (houses). Prices ranged from GHC100, 000 ($25000) for one bedroom housing units to GHC1m ($250,000) for 3 bedroom housing units. Currently, the per capita income of Ghana at market values is around GHC5, 764 ($1,441). At this rate, it will take 17 years for the average resident to acquire a one bedroom house if they save their entire income. For a typical household (in Accra) with 4 members where 2 members earn the per capita income it will take 8.5 years of saving the entire household income to acquire a one bedroom house in most suburbs of Accra and Tema. Since it is not practical to save one's entire earnings it implies that it may even take much longer. Moreover given that one bedroom is woefully inadequate for a household of 4, the situation becomes even more worrying.

Furthermore, as pointed earlier, about a quarter of residents in Accra and Tema in the greater Accra region live below the poverty line of GHC1, 314 per annum. So even for those who are considered to be above the poverty line, a significant number more (up to GHC5, 764) will still not be able to afford decent housing in Accra and Tema. To put it differently, our estimates show that at a fixed interest rate of 25%, a 30 year mortgage from Ghana Home Loans will require a monthly repayment of GHC2,084 to purchase a one bedroom house in Accra or Tema at GHC100,000 ($25000). Given the housing need of Accra and Tema, GHC 7.97 billion ($1.85 billion) is required annually to provide two and three bedroom houses that cost about GHC200,000 ($50,000).
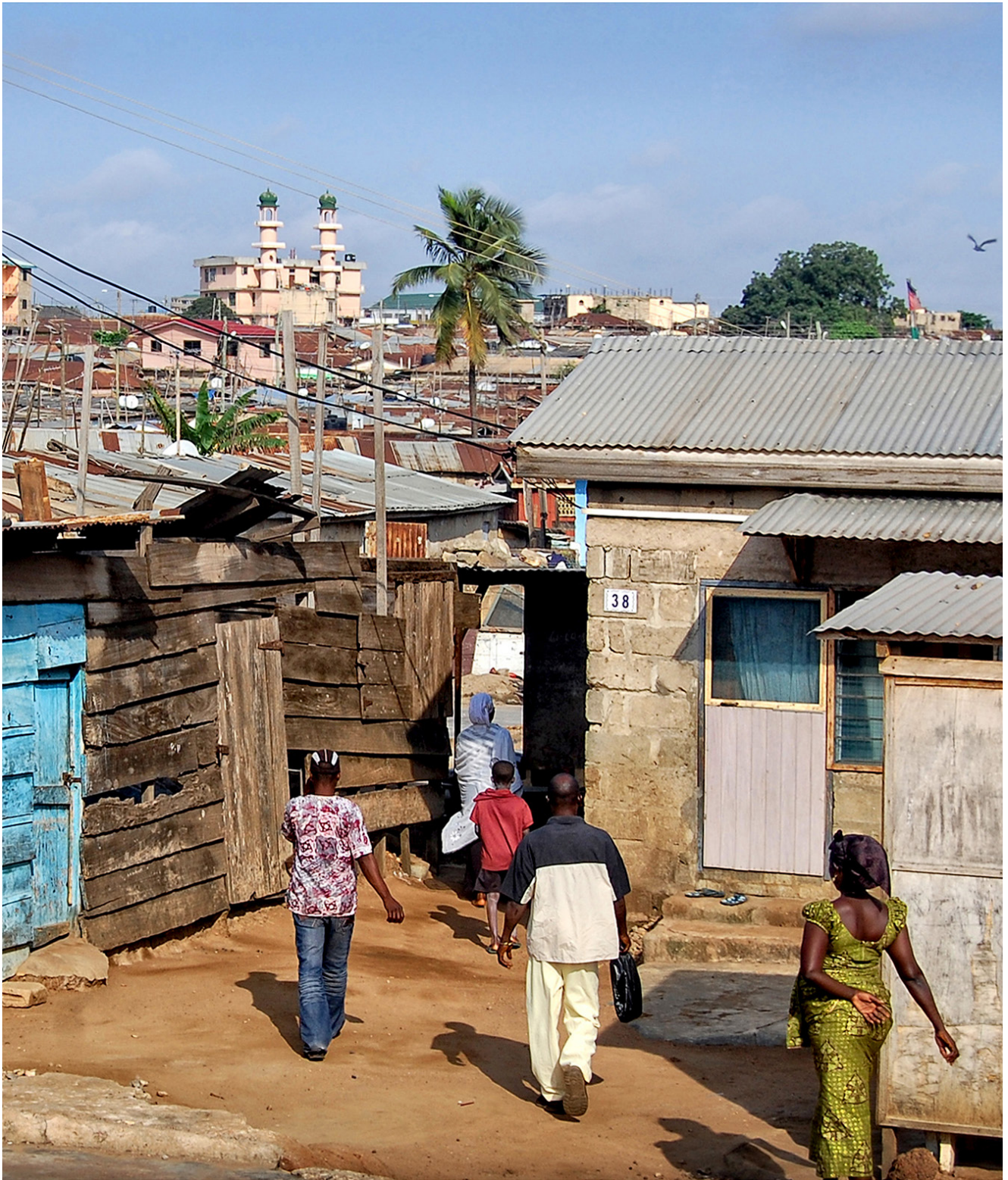
A Suburb for the Urban Poor in Accra © SHUTTERSTOCK/ Nataly Reinch

Thus far it is evident that low income earners cannot autonomously obtain their own housing and the government cannot set price controls in a free market and so we recommend that government should include the provision of pro-poor housing infrastructure as part of its social intervention policies. Providing housing for the poor can contribute significantly to improve upon a nation's human capital and enhance its economic capacity. This is in addition to the numerous social benefits that naturally follow such provision. The Ghana government's official definition of affordable housing is one that costs up to 30% of household income in rents or mortgage repayments (National Housing Policy, 2015). For the 25% of our survey respondents who earn below GHC1000 ($250) a month, this is certainly not feasible because they have other needs which would be woefully affected if they spend that proportion of their income on rents. They certainly would not be able to buy their own house since that level of income will not qualify them for sufficient loan sums or mortgages to purchase a home. In addition to that, they cannot save enough to build if they have to spend some of their income on other needs such as rent and other basic necessities. This means that by official definitions, there is no affordable housing in Ghana for low income earners. This explains why many of the people cannot afford alternative housing though they find their current housing conditions inadequate (see figure 2.23)

Critics of affordable housing programs in developing countries have often argued that those programs further widen the housing inequalities. Information available from official government sources shows that the ongoing affordable housing project at Saglemi (in the Greater Accra Region) of 11,000 housing units will cost $200m. This brings the unit price to about $18,182 (GHC71, 637).It will take the low income bracket of the population at least 55 years to acquire these affordable housing facilities if they earn and save at the upper poverty line annually and 5 years if they earn and save a monthly income equal to the upper poverty line. 25% of our survey respondents who earn monthly incomes below the upper poverty line cannot afford these so called affordable houses. These units will however

get sold anyway; certainly not to the poor they were meant for but to the middle and high income bracket who can conveniently afford them.

2.2.4 Financing Needs for Lower-Middle Income Housing

The middle class consists of people who leave on between $2.20 and $20 a day (AfDB, 2016). In Ghana, this would include households who earn a little less than half of the national per capita income up to those who earn 5 times the per capita income. 21% of our survey respondents can be considered to be in the middle income group (see Figure 2.7). Urbanization and economic growth have interplayed to reduce absolute income poverty because it has led to an expansion of the middle class in developing countries. Economic growth has been accompanied by socio-demographic changes such as higher incomes, better healthcare and higher life expectancy.

The middle class includes people who have secondary or tertiary education and have salaried jobs-at organizational levels below the top management. In Ghana this class is large particularly in urban areas (21% of our sample, Figure 2.7) and they have fairly stable employment and so are able to invest in health, education and afford formal housing. The growth of the middle class has brought home ownership within the reach of more people and increased the amount of borrowing to finance cost of housing. The growing ambition of the middle class worldwide for home ownership has led to the emergence of a rapidly growing real estate industry worldwide, particularly in developing countries including those in Africa. Globalization and FDI inflows have evidently increased pressure on urban lands in developing countries because investors consider real estates as safe investments(ICLEI, 2015). This is typical of the situation in Ghana. For instance over the last decade it is common to find foreign companies offering residential housing and dominating housing fairs. The 2010 census indicated a 50% increase in the number of housing units (distinct from dwelling units) to 3.39 million from 2.88 emphasizing that there

is a growing middle class. It is expected that those in the upper middle-income category will be able to purchase their own housing units.

A basic challenge of the urban lower-middle income category has to do with their tenancy. We observe that the many of the lower income category in Accra occupies rental housing units (50.8% of our respondents, Figure 2.14). The observable difference between the rental units occupied by middle and low income tenants is the age of the house, the facilities in the house, the environment and the rents paid. 43.1% of our respondents who said they rented their dwelling reported that they paid between GHC150 and GHC250 monthly (Figure 2.15). Units occupied by lower middle-income earners are relatively new or have been renovated recently. 44% of respondents said their dwelling was less than 10 years old (Figure 2.9). These units have inbuilt bathrooms and toilet facilities (popularly called self-contained, Figure 2.12) and the environment is generally more hygienic than low income earners'. The rent for these units per household is between GHC150 for single rooms and GHC500 for 2 bedrooms (Figure 2.15). Also, landlords of such housing units take at least 2years rent advance (65.7% in our sample, Figure 2.16) from tenants as compared to landlords in slums and other deprived communities who take rents monthly. Rent advance is a major challenge for the urban lower middle income as they find it difficult to raise two years rent because they are salaried employees. Many of them therefore resort to rent loans from microfinance institutions or family and friends to be able to afford rental units.

For instance, we interviewed a young man of about 25 years who graduated from the university two years ago and had moved to Accra to get employment. He initially lived with a relative in Tema where he had an internship for some time. Earlier this year he got a job in Accra and decided to relocate. His monthly rent for a single room self-contain is GHC130 but his landlord asked for 25 month rent advance. This was the cheapest the real estate agent could get. Meanwhile he had to pay 10% of the total rent to the agent as a fee for his services. His net monthly salary is GHC770 ($192.50) and the required advance is GHC3250 ($812.50)

plus GHC325 ($81.2) agency fee. Since he could not raise this amount he had to rely on his mother to send him money from his hometown. Clearly he falls within the lower-middle income bracket since his net annual income is GHC9250 ($2310). His story is typical of many first degree graduates in Accra and Tema (82.2% in our sample, Figure 2.4).

The rent act of Ghana, ACT 220 (1963), requires that rent advances should not exceed six months. This law is currently being reviewed to reduce the period of advance to one month. Unfortunately, given that demand significantly exceed supply; the proposed revision could worsen the situation further by serving to reduce the incentive of prospective landlords to offer rooms for rent. Moreover, the current six month requirement is being violated and two years advance has become the de facto norm. While it is important to mitigate the burden on tenants, it is important to ensure that the already insufficient supply is not reduced further or lost completely. There has been an expansion of housing finance across developing countries. This has been by both formal and informal sources. In Ghana for instance Housing finance among the middle class has been by private savings and a little by mortgage.

Banks traditionally considered the mortgage market unattractive. This has however changed slightly in recent times as it is now common for banks and other financial institution to offer home loans. That notwithstanding, the 2010 housing and population census recorded a decrease in the number of national stock of housing units that were being acquired through mortgage financing from 1.1% to 0.8%. The figure is slightly higher for the Greater Accra region at 0.9% as at 2010. This is expected since a sizeable proportion of the residents in the region can be expected to be able to afford mortgage payments compared to residents of other regions with the exception of the Western (0.9%) and Ashanti (1.2%) regions. These statistics point clearly to the fact that at the current state, the mortgage industry is not important in meeting the housing finance needs of urban dwellers and that there is the need to initiate more innovative and workable solutions to housing finance. In our

sample, 4.4% of respondents who said they owned their dwelling had acquired it using a loan or mortgage (Figure, 2.18). It is common to find non-bank financial institutions and microfinance companies offering mortgage products to the lower and upper middle class in urban areas. The major shortfall of this sector is that whiles it lends to the low and lower middle class, the loan amounts are usually not sufficient to purchase or construct the required housing units.

In a study of the housing sector among developing countries Ferguson (2004) noted that about 65% of developing countries' residents could not afford the housing mortgage payment even for mortgages on the cheapest houses. As we noted earlier, the monthly repayment on a mortgage to acquire the cheapest urban house in Ghana cannot be afforded by the majority of urban households interviewed; even for those with some tertiary education and working in the formal sector. When asked how much they could afford if they had to buy or build their own house, 27% of respondents who did not already own a house said they could afford less than GHC50, 000 ($12500), 32.6% said they could afford between GHC50,000 ($12500) and GHC100,000 ($25000) and the rest said they could afford homes that cost more than GHC100,000 ($25000) (Figure 2.26).

The situation does not get better for households aspiring to live in comfortable apartments close to the cities' centers. One of the reasons identified for this is that urban households often have informal and fluctuating income sources. As a result of this most households prefer to construct their own housing units through private savings and informal sources of finances over a period of 5 to 15 years (95.5% of homeowners in our sample, Figure 2.18). This explains why there are many uncompleted buildings in many new residential areas in and around Accra and Tema. The quality of these houses is also an issue worth considering given that most of these are "do it yourself" styled construction (64.6% of homeowners in our sample, Figure 2.19). The prospective homeowner usually assembles masons and other artisans without a building plan and no knowledge of the kind

and quality of materials they require. A simple verbal description of what they want is all it takes to commission the construction. For instance, while it is recommended by building professionals that the number of blocks per 50kg bag of cement should be between 25 and 30, in our interrogation, all block factories we spoke to in Accra revealed that they make up to 50 blocks per bag of cement.

The other option of molding one's own blocks is not practical for most prospective homeowners because they cannot be present (they go to work) to check that the right number of blocks are made per bag and because most available lands are often far from where they currently live, they cannot protect their blocks from thieves (another challenge). In addition, because they want to minimize cost, they do not engage foremen and professionals. According to block factories we spoke to, they did not know that the appropriate number of blocks per bag of cement is 25 to 30. Thus we can conclude that many housing units in Accra and Tema built by middle income households are substandard.

2.2.5 Interaction with City Officials

In Tema, we spoke to the City authorities at the Tema Metropolitan Assembly (TMA) to get their input on the housing situations and the projections for the sector. The authorities at the planning unit of the Assembly gave the total households in the metropolis to be 73,193 and the total residential housing stock to be 40,956 units. This means that 1.8 households are resident in each housing unit. The planning unit, however, did not have any data on the housing deficit and the planning officer directed us to the national estimates which are found in the 2010 census report. We have already presented this information in previous sections. Other departments in TMA and other Assemblies told the team that they did not have data on their own except what is present in the census report. The next census is expected in 2020. Compared to the figures in the 2010 census, the number of households had increased by 2396 and the number of households per housing unit had increased from 1.7. This shows that more households are

now being forced to live together in the same house. This corroborates earlier findings in above. The district survey data shows that majority of housing unit are owned by the resident households' members (48.2%) while a third of households' dwelling were owned by other private individuals. Governments only owned 5.2% of dwelling units in the Metropolis. These according to the planning office, are allocated to public officials who pay rent to the assembly or other government agency. This reveals that private ownership is the most important form of home ownership in the metropolis.

The assembly does not have official data on the housing deficit but the planning department told the team that to reduce the deficit, the assembly was going "to collaborate with the private sector to construct low-income housing for workers to reduce the deficit". We interpret this to mean that the local authorities do not have any real plans to meet the housing deficit of the city. We got similar responses across assemblies in the two cities. The closest public intervention in housing is by the Tema Development Corporation who provides urban housing through PPP projects; we have discussed this earlier. There appears to be a laissez-faire approach to meeting the housing needs of the city. Given this implication, the officer confirmed that they had no official estimates on the potential cost of meeting the deficit.

According to the planning officer, the only on-going "affordable" housing project in the area was in a neighbouring district and this is a state managed project, which has been stalled due to financial challenges. On rental housing, the only available rental scheme was for the staff of the assembly; this was, however, according to him, limited. The staff who occupied these units paid 10% of the monthly salaries as rent to the assembly.

With regards to challenges in the city, the city authority decried access to land, the development of slums across the city and the limited availability of mortgage financing as among the most important obstacles to the city's housing. The census data show

that less than 2% of all housing units in the Tema metropolis had been acquired through mortgage. The approach by the assembly to mitigate these challenges is to liaise with traditional authorities to facilitate land acquisition by the private sector to enable that sector to provide cheap housing to the public. Furthermore, the assembly is actively enforcing its by-laws on housing and land use and enhancing the efficiency of the processes involved in the acquisition of building permits. Overall, the housing industry in Tema is private sector led and public sector regulated. On private involvement, we find that many residents build their housing in a "Do it yourself" mode rather than acquire them through real estate companies. This is approach is mainly considered to be cheaper. We have discussed this extensively in previous sections. Nonetheless, this raises concerns over quality which the assembly needs to be concerned about.

Authorities at the Accra Metropolitan Assembly do not have housing as a priority area and so they were not able to give adequate numbers and figures regarding housing. The team was asked to refer to the figures reported in other official publications by the central government. The planning department however told our team that there was a housing deficit of over 140000 units in the city but there were no immediate plans by the assembly to construct housing units. The assembly had attempted to engage a private developer from Brazil to construct residential buildings at the outskirts of the city but this effort has not been able to yield fruit due to bottlenecks emanating from central government. As in Tema, the assembly has a few housing units that it rents to its staff. Overall, the main challenge for affordable housing in the city is unavailability of land and when offered, lands are often so expensive that it is not feasible to use them for affordable housing projects because they would not be affordable. Moreover, recurrent expenditure such as sanitation and maintenance of public infrastructure uses up all of the revenue raised by the assembly. Funding will therefore remain a challenge even if the city authorities could find suitable land. The situation is no different at other municipal assemblies in the Accra City.

2.2.6 Interaction with Real Estate Industry

The team spoke to officials at the head office of the Ghana Association of Real Estate Developers, management of individual real estate companies and officials at Ghana Home Loans, the only company whose core business is Mortgage Financing. These institutions do not have any estimates of the housing stock in the two cities and the deficits even though they all believe there are significant deficits in the housing stock there.

They identified high cost of land, building materials and the unavailability of adequate financing as some of the challenges. They also bemoaned poor road network inadequate drainage facilities as other challenges that they face in the housing delivery in the cities. In addition to these, officials at Ghana Home Loans considered low income levels of residents as a major challenge in their business. Generally, it is considered impossible for a middle income household in Accra and Tema to purchase a housing facility or qualify for mortgage loans. Finally, they mentioned that there is bureaucracy in acquiring land documentation and building permits which also affects their business adversely.

Regarding financing, the developers complained that they obtain funding at a high cost and so they end up passing on the cost to their customers; this view is shared by Ghana Home Loans. Furthermore, the mortgage provider reported that they find it difficult to obtain long term funds. Real estate projects are medium to long term projects and so may take up to a decade to recoup investments. If they are not able to obtain patient capital, they would end up charging high interest and formulating "crude" lending terms which will ultimately put borrowers off. This is the case according to the officials.

The main sources of financing for industry players include Equity and loans from commercial banks and they consider this as not being sustainable in the long term because they borrow short-term to lend long-term.

This means that they require constant refinancing at short intervals. They recommend alternative financing such as making pension funds from SSNIT available to real estate companies and mortgage providers and setting up real estate investment funds. The impact of these alternative funding sources will include lower interest rates and enhanced access to financing. On the economy as a whole, a booming real estate sector will create jobs and contribute to growth.

To make housing provision easier, they recommend that government should subsidize infrastructure such as roads and drainage systems that real estate companies provide in the areas they develop. Additionally, they want government to provide funding to the sector (or facilitate it) at low interest rates and remove taxes on homes, mortgage loan interests and building materials. Also, they recommend "rent to own" options and building high-rise facilities with multiple flats instead of detached units since there is scarcity of land in the cities. They want the role of government to be limited to policy and the creation of an enabling environment to help the private sector to thrive.

2.2.7 Conclusion

Our interaction with housing industry players revealed that they can provide urban housing at an average of $50,000. We therefore estimate that about $1.85 billion is required annually to clear the deficits and accommodate new households over the next decade. These can be made accessible to low income earners through rental and middle income earners through a rent to own option. Mortgages can also be used as financing tools for salaried workers using the housing unit and their pension as collaterals. We recommend that the private sector should be allowed to lead in this sector while government plays a regulatory role. Government should however make investor friendly rules to attract external capital and to reduce the cost of financing.

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Access to portable water by households in Accra were either by inside pipe (13.4%), water vendor (73.2%), neighbours' private (11.9%), public stand pipes (1%), boreholes (0.2%) and wells (0.3%).

2.3 Financing Needs for Infrastructure and Urban Services

2.3.1 Financing Needs for Water and Waste Management

Status of Access to water

Urban water supply is mainly by the Ghana Water Company Ltd. According to the Ghana Living Standard Survey round six (2014) almost all urban households (95%) have access to portable water (e.g. pipe, bottle/sachet, protected well/spring, and borehole). This however differed according to urban income categorization. Among the urban poorest fifth, almost six out of ten (56%) households had access to portable water while almost all of the urban richest fifth (99%) had access to portable water. Access to portable water by households in Accra were either by inside pipe (13.4%), water vendor (73.2%), neighbours' private (11.9%), public stand pipes (1%), boreholes (0.2%) and wells (0.3%). Though access had improved compared to round five of the survey in 2006 the results were mixed. Compared to 2006, the number of households (42.3%) who had inside pipes was significantly more at that time than in 2013. This shows that more people had had to get water from other sources other than their taps. The government has announced since then that they have restored the situation for some households in Accra but the statistical service has yet to report on the state of the situation since round six.

The number of households who purchase water from vendors either by water tankers or other vendors has increased more than fivefold compared to 2006 (14.34%). Fewer households now rely on their neighbours' private inside pipes (37.64%). This can be explained to mean that they now prefer to purchase from vendors than to rely on neighbours''. Public stand pipes, boreholes and wells are becoming less popular compared to the time of round 5 when 4.52%, 0.09% and 1.12% relied on these sources respectively. More than two out of five households in Accra (44.5%) use sachet water as their main source of drinking water. Less than a third of households in Accra use pipe-borne water as their main source of drinking water. 93.6% of the residents of Accra included

in our survey reported that they had access to portable water from inside pipe water (66.1%), boreholes (9.4%), and neighbour's inside pipe (5.5%) or vendors (12.6%) (Figure 2.27) and 61.1% were satisfied with their current source of water the way it was (Figure 2.32). 93.1% of these residents reported that their households spent less than GHC100 on water each month (Figure 2.30). 67.7% indicated that their households' main source of drinking water is sachet water (Figure 2.31).

Given the current situation, the major need of urban water in Accra and Tema is improving access of portable water to households. There is the need to expand access by ensuring that more households get their water in pipes inside their houses. This will not only save on cost but will also improve sanitation in the households. Given the current expenditure by households on other sources of water in the cities, it is certain that they will be able to afford inside pipes. Households can however not do these without public sector support since the water supply in the country is exclusively by the Ghana Water Company Ltd, a state institution.

More pipelines have to be laid and existing ones renovated to enable households have clean water flowing into their homes directly without having to walk long distances to get water or pay huge sums for trucks to supply water to their household.

Waste management profile
One out of every two households depend on public dumping sites (called borla) to dispose their solid waste while less than a fifth of households have them collected by waste vans (GLSS6, 2014). Our findings show that 84.7% of residents had their solid waste collected by either trucks (61.3%) or tricycles/push carts (23.4%) and 95.1% did this at least once a week (Figure 2.43). Our findings show that the expenditure on household solid waste management could go up to GHC150 for 97.5% of households in Accra and Tema (Figure 2.45). 75% of residents revealed that this expenditure consisted mainly of fees paid for collection of their waste. 77.4% of these households said that they did not currently separate their solid waste but 69.6% indicated that they could consider separation in the future (Figure 2.42).

Table 2.5: Satisfaction with Municipal services

	Yes	No	Indifferent
Solid waste management service to domestic premises	34.2%	53.8%	12%
Solid waste management service at commercial /market/ trade premises	13.4%	73.2%	13.4%
Street sweeping	20.4%	65.5%	14.2%
Development/building plan approval	18.3%	69.6%	12.2%
Grass cutting	17.2%	64.7%	18.1%
Drain/river cleaning	12.2%	79.1%	8.7%
Public toilet cleaning	13.8%	64.2%	22.0%
Removal of dead animals/garden waste/bulky/waste/ abandoned vehicles	12.2%	69.6%	18.3%
Public education and Special solid waste management campaign/project Others	13.6%	76.3%	10.2%

Source: Survey Data, 2016

In addition to discussions earlier in the chapter, the GLSS6 reported that less than three out five (55%) among the poorest fifth of households in urban areas have access to toilet facilities while more than four out of five of the urban richest fifth have access to toilet facilities. Access to toilet facilities mainly include flush (i.e. WC) (34.2%), pit latrines (10%), public (31.3%) and KVIP latrines (20.6%). These have only changed marginally between 2006 (round 5) and 2013 (round 6). Among other things, households who have WCs may not use them often given that water does not flow in their private taps as indicated in the immediately preceding paragraph. It is common to find people using the toilet only when they go to the office. Our findings revealed that 91.5% of residents in Accra and Tema had access to a private WC and for those without Private toilet facilities (Figure 2.34), 76.2% said they could access a toilet facility within a 200m radius (Figure 2.35). 83.5% said their households were satisfied with their current accessible toilet facility (Figure 2.37). Household expenditure on toilet facilities was reported to be at most GHC150 for 95.9%

of households (Figure 2.36). Households that were not satisfied with their current toilet facilities indicated that they were willing to pay up to GHC5,000 to obtain improved access. When asked whether they were satisfied with various municipal services, a majority (53% to 79%) of the respondents indicated that they were not satisfied with all municipal services (Figure 2.33).

Municipal service is the major aspect of urban sanitation requiring attention. A few years ago, it was common to find the streets of Accra being swept and gutters being taken care of on daily basis by workers of local government units or firms given such contracts. Traditionally, municipal services have been provided by engagement with private sector companies or by the local government authorities employing people for these services. This is however not evident any longer and this explains the dissatisfaction expressed by the residents. Attention is thus required for this aspect of urban sanitation.

Interactions with city officials: Tema

Sanitation

On sanitation, the team interviewed the head of the City Sanitation department. Among the data collected are the state of sanitation in the city and the plans the city has for this sector. The annual budget of the city authorities was given as $3million but actual expenditure/cost of sanitation is $10 million. According to officials, this expenditure is financed partly by the assembly, donors and residents. The World Bank is currently the only donor that supports the sanitation department. The support received from the bank is mainly through funded projects targeted at

localities within the metropolis. This means that the budgeted $3million comes from the assembly's internally generated funds whiles the remaining $7million is both from the World Bank and residents. The assembly has engaged private firms to undertake the collection of solid waste in the city. These firms collect fees from the residents under the polluter pay principle but the assembly pays for waste collection in public areas. Internally generated funds consist of rates, fees, fines and levies collected by the assembly. This source was, however, reported to be inadequate and so there is a backlog of waste uncollected or

that are not properly treated. The department could not mention what the quantity of the backlog is but mentioned that the extent of the inadequacy is 70% of the required funding. That is to say that, besides the current annual budget amount of $3million, the assembly will require additional $7million to sufficiently manage the city's sanitation.

Furthermore, the assembly's main expenditure on sanitation covers public areas and areas that do not directly belong to any individual. The major components of this expenditure are solid waste management, septage management; desilting of drains

and sewage maintenance. Residential solid waste is collected by private entities registered by the assembly who undertake collection at designated times in the day and charge a fee directly from the residents for this services. This has been discussed in earlier sections. Liquid waste in the city is disposed mainly through the city's sewerage system (39.5%) and drainage (or thrown) into gutters (40.4%). Other channels include drainage into a pit (4.2%) or throwing unto streets, compound or other open areas (15.9%). Liquid waste management practices in Tema are similar to those in Accra since many of these practices are sanctioned by the Ministry of Local Government.

Currently, the activities that are implemented by the city authorities to manage the sector include ensuring that the residents participate in the National Sanitation Day Programme. The programme takes place on the first Saturday of the month and requires residents to clean their immediate external environment and other public areas. The assembly facilitates this by providing cleaning tools, materials and other cleaning equipment. The assembly also supports civil society organisations that organise clean-up activities by providing tools and equipment. In addition to this, the assembly conducts routine sewer maintenance and drainage cleansing from time to time.

Regarding, infrastructure, there are no plans at the city level for new sanitation infrastructure but are focused on maintaining existing ones. The city of Tema is considered to be one of the few in Ghana that has benefited from some coordinated planning for the last six decades. This explains why there appears to be extant provision for some of the important public infrastructure. Our conclusion, therefore, is that the public sanitation financing needs of the city, as presented by the authorities, are maintenance, materials, equipment and personnel cost which is valued at $10million annually. 30% of this amount is generated internally and there is a deficit of $7million annually that is required to meet the needs of the city.

Water

We learnt from our engagement with the metro office of the Ghana Water Company Ltd., a public entity responsible for water supply in Ghana, that the total annual supply to the city of Tema in 2016 was 23,386, 551 m^3 and this was expected to generate GHC168, 803, 534 ($42, 200, 883) in revenue. They were, however, able to collect GHC140, 557, 896 ($35, 139, 474) which represents a revenue loss of 16.73%. According to the Chief Manager, the supply to the city was adequate and there was no shortfall in water supply. This was corroborated by the planning office at the Metropolitan Assembly who said water supply in the city was

over 98% and that there was no major challenge in that sector. In addition, demand only grows by about 2% annually and they have the capacity to meet this annual growth. The Chief Manager explained further that the city was "choked" and so there was no expectation of large increases in demand. He was, however, quick to add that in the event that the defunct factories resumed there could be a significant increase in the demand.

The major challenge of the sector in Tema was the losses they incurred in revenue collection. The chief manager informed the team that the sector in the city is currently doing well and they are not planning or foreseeing any

significant infrastructure needs except to continue to maintain the existing facilities. The company does this routinely and in addition, changes pipelines from time to time. The company expects to improve their revenue collection and this according to the manager is all that the city water management needs to do.

We conclude therefore that the distribution of water in Tema City is efficient and has no major challenge but suffers challenges in revenue collection. There are no major infrastructure needs for water in Tema. Water processing and treatment is not managed at the city level and so it is beyond the scope of this study.

Interactions with city officials: Accra

Sanitation

Speaking to officials at the various assemblies, it was evident that they were mainly concerned with sanitation, environmental health and public works. This is confirmed by the extant information provided in this area. According to officials at the Accra Metropolitan assembly, the total solid waste generated in the city is 2385 tonnes per day. This amounts to about 870525 tonnes per annum. This is made up of household waste and waste generated in markets and other public places but does not include industrial waste. Organic waste constitutes 65% of solid waste. The rest are inert materials (11%), paper (6%), plastics (10%), metal scraps (3 %) glass (3%) and textiles (2%). There is no official data on the amount of industrial waste generated in the city. The uncollected waste finds their way into gutters, water bodies and unoccupied land in the city. This has caused outbreak of diseases and flooding in the past and are expected to cause same in the future if not attended to.

Figure 2.2: Solid waste composition Accra city
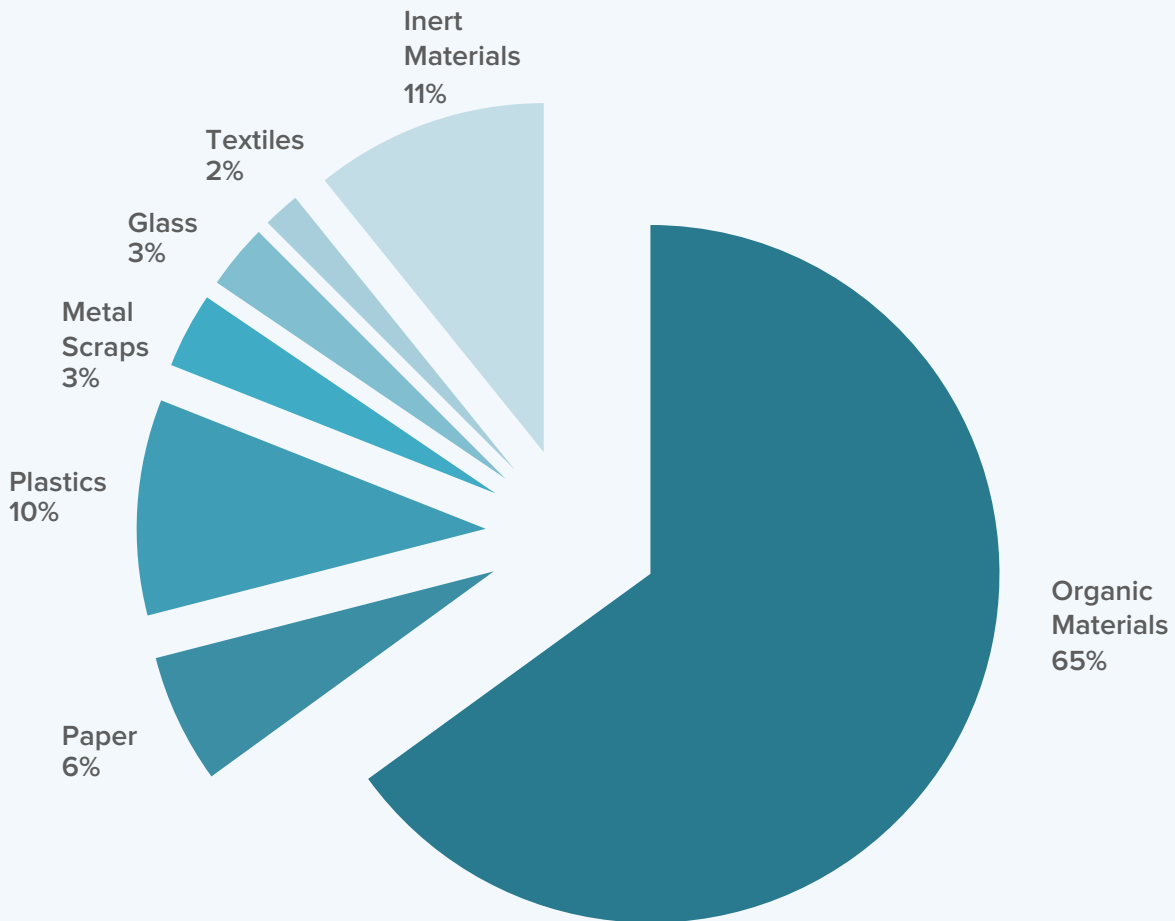
Source: Waste Management Dept., AMA. 2016

Figure 2.3: Where the uncollected waste go
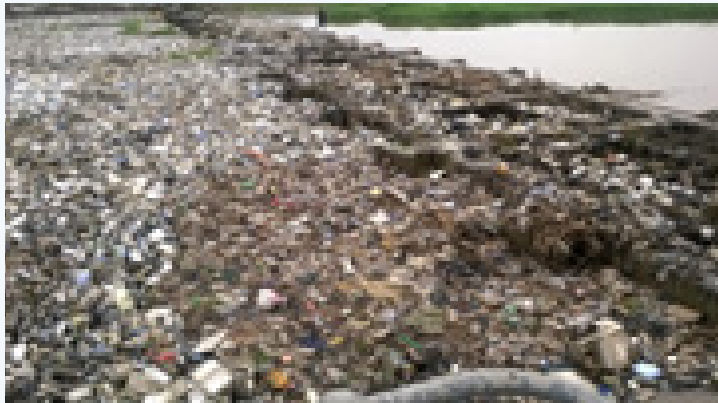
Source: Waste Management Dept., AMA. 2016

Public areas are cleaned by personnel from both private companies and staff from the AMA. The breakdown of personnel deployed daily and some of the equipment used is given below:

- In-house Laborers on sub-metro basis – 700

- YEA Operatives on sub-metro basis – 1,994

- Deployment of 10 Compaction trucks daily for the collection of the sweepings

- Coastal Sanitation Guards -163

- Installed Public Litter Bins in the Central Business District - 140

Households have been registered by the assembly and given dust bins where they store solid waste for collection. The waste materials are collected by trucks and motorized tricycles. Trucks are used to collect solid waste, door-to-door, at suburbs that are less dense and have good road layouts. In other areas however, there is a centralised "dust bin" for the whole community where every household dumps its waste for collection. Private individuals have recently begun using motorised tricycles to collect these household wastes to these communal dust bins at a fee.

According to officials at the waste management department, 94% of the total waste generated is collected. The formal collection system is able to cover 70% of total waste generated while a quarter of the total generation is collected through an informal system. 140metric tonnes remain uncollected on a daily basis.

Daily Generation
2,385 Tonnes/Day

Formal Collection
1,665 Tonnes (70%)
• Door-To-Door
• Communal Systems (Intervention)

Informal System
580 Tonnes (25%)

Total Coverage
2,245 Tonnes (94%)

Deficit
6% (140 Metric Tonnes/Day)

Source: Waste Management Dept., AMA. 2016

Table 2.6: Sanitation Contracts and equipment

Contract Lots & Equipment Holding (Between AMA & Service Providers)		AMA Equipment Holding	
Item	No.	Item	No.
Contract lots	15		
Service Providers	12	Compactor	1
Equipment holding:		Roll-on-off	1
Compaction truck	49	Multy-lift	2
Roll-on-off	5	Tipper Trucks	4
Skip Loader	5	Cesspit Emptier	1
Total	59	Wheel Loaders	2
Other Equipment		Excavator	1
Tipper Trucks	12	Bulldozers	2 (Broken down)
Borla Taxi	34	Borla Taxi	11 (5 Broken down)
Motor Kings (tricycles)	850	Motor Kings	5

Source: Waste Management Dept., AMA. 2016

The waste collection function is undertaken mainly by private sector actors. The metropolis has been zoned into ten sub-metros and each zone has been assigned to private waste management firms. Details about the number of contractors engaged and the equipment these firms use are listed below in Table 2.6. Details are also given about the equipment that the assembly owns. The data shows that the AMA has equipment that is unique from what the private contractors use and these are used to undertake other activities that complement the services of the private firms. The sanitation management of the assembly is supported by the Sanitation Standard Implementation Committee (SSIC) that was set up and tasked to implement the Assembly's District Sanitation Strategic Action Plan (DESAP). This action plan ended in 2016 and has not been replaced. The committee is however being maintained to perform monitoring functions while daily management of the city sanitation is done by the waste management department.

Our team also learnt that there are two transfer stations that are currently owned by the assembly. Transfer stations are temporary sites that are used to hold refuse for onward transfer to the end point. An official of the assembly decried the inadequacy of the existing transfer stations and described one of them as a "toy". The assembly requires a minimum of four transfer sites. As at the close of 2016, two new ones are required and

expansion or total replacement of one of the two stations located at Kokomlemle (the "toy"). The endpoint of solid waste is the numerous landfill sites located within the Greater Accra region. A list of the land fill sites and their location is presented below in table 2.7. These also represent the waste disposal practices in the city.

Figure 2.5 Transfer Stations

Kokomlemle Transfer Station

Teshie Transfer Station

Source: Waste Management Dept., AMA. 2016

Table 2.7:Waste Disposal Sites and Treatment Centres in Accra

Land fill sites
Tema Engineered Landfill
Nsumia Semi Engineered Landfill
Abokobi Landfill
MRF-based Sorting, Compost and Recycling plant in Adjen-Kotoku by Zoomlion
Informal treatment centers
Old Fadama
Mallam Market
White Cross (Weija, Ga South)
Tunga (Dansoman)

Source: Waste Management Dept., AMA. 2016

Analysis of sanitation financing need shows GHC78, 347, 250 ($20m) is required to clean the city annually (table 2.6). This cost constitutes the expenditure noted above. There exists a funding gap of GHC4, 700, 835 ($1.2m) representing the annual backlog of 6% (table 2.6). The director of budget at the assembly was of the view that, an additional annual funding of $3m would be enough to meet this deficit and infrastructural needs such as the construction of new transfer stations and maintenance of old stations and landfill sites. This will also pay for training of waste management personnel, other capacity building activities, replacement of old equipment, public education and to put in place an enhanced research unit and improve upon its database for planning purposes. The current sources of funding include the common fund of the Members of parliament of the District, Fees from waste Collection and other Internally Generated Funds (IGF).

Figure 2.6 Landfill sites

Source: Waste Management Dept., AMA. 2016

Liquid Waste

Total daily liquid waste generation in the City is estimated to be about 140000 cubic meters. 15% of this waste is served by a piped waterborne sewerage network while 9% consists of open defecation. The remainder are served by on-site facilities such as septic tanks and improved pit latrines. These are let into open drains that eventually go into water bodies such as the lagoon and the sea. Total Septage generated in the city is estimated to be about 1500 m³. The main site in the city where collected septage is dumped is the lagoon at Korle Gonno. A septage treatment plant with a capacity of 2000 m³ was opened by a private company in November of 2016 to serve the city. The plant was receiving 50 truckloads of septage on a daily basis as at December 2016.

Table 2.8: Cost of waste collection by AMA

Service Type	Generation Per Day (tonnes)	Rate Per Tonne (Gh¢)	Current Annual Expenditure (Gh¢)	Cost For 100% Service Per Annum (Gh¢)	Funding Gap (Gh¢)
Collection	2,385	60 ($15)	49,097,610 ($12,274,402.5)	52,231,500 ($13,057,875)	3,133,890 ($783,472.5)
Disposal	2,385	30 ($7.5)	24,548,805 ($6,137,201.25)	26,115,750 ($6,528,937.5)	1,566,945 ($391,736.25)
Total	**2,385**	**90 ($22.5)**	**73,646,415 ($18,411,603.75)**	**78,347,250 ($19,586,812.5)**	**4,700,835 ($1,175,208.75)**

Source: Authors' Computations and Waste Management Dept., AMA. 2016

Figure 2.7 Septage Treatment Plant in Accra

Source: Waste Management Dept., AMA. 2016

New interventions that have been put in place to manage the city liquid waste include the septage dewatering plant which is expected to be completed by March 2017, expansion of the Mudor Sewage Treatment plant, a Sewage treatment plant at Legon and rehabilitation and extension of the sewage network in the city. The Dewatering Plant has a capacity of 800m³/day and costs $2.8m; funded jointly by the Danish and Dutch governments. The Mudor plant has a capacity of 18000m³/day and is 98% completed. Officials reported that though the plant is not new, it has not been used for more than 10year. The rehabilitation works ongoing as at December 2016 are expected to revive the plant for use in the immediate future. A further 8558m³ is treated daily under the Accra sewage improvement project.

Under the Project, a sewage treatment plant at the University of Ghana, Legon has been constructed to serve the university and its environs. The treatment concept is founded on waste stabilization ponds with an outfall discharging into a nearby water course. Fresh fishes have been introduced in six Maturation ponds for quality control and aqua culture purposes. Consumption of the fish has been certified by the Fisheries Department of Water Research Institute - CSIR. Five sewage transfer pumping stations have also been constructed at the following locations: University of Ghana Main Campus, Presbyterian Boys' Senior High School, Achimota School, and University of Ghana Staff Village to lift sewage to the Legon Sewage Treatment Plant for treatment. Four new

sewage transfer pumping stations have been constructed at the following locations: Accra High School, Dansoman (Shiabu and Mampong Okine areas) and Korle Bu junction. These stations lift sewage from Dansoman, Mamprobi, Korle Gonno and Korle Bu Teaching Hospital to the Mudor Sewage Treatment Plant which is currently undergoing rehabilitation. Four existing sewage pumping stations situated at Labone, Ministries, State House (Parliament House), and High Street have also been recently rehabilitated. The sewage transfer station performs functions similar to the solid waste transfer stations described above.

Figure 2.8 Mudor Sewage Plant and Sanitation Equipment

Source: Waste Management Dept., AMA. 2016

14.4km of new sewers have been constructed to connect Achimota School and its environs and the Staff Village of the University of Ghana to the City's sewerage system. About 50km of old sewers have also been recently rehabilitated. 15kmof new sewers have been constructed to connect Dansoman (Shiabu and MampongOkine areas) to the Central Accra Sewerage system. About80km of old sewers have also been rehabilitated.works are being carried out on the sewer line through the Timber Market to the Hansen Road.

As part of these projects, the following equipment were procured: seven Cesspool Emptying Vehicles, three Sewer Flushing Trucks, three Service Maintenance Trucks, one Horizontal Drictional Drill Machine, three Heavy duty dewatering pumps, two Sewer rodding machines, one Tractor with Slasher and other sewage treatment plant equipment. Tracking devices have been fixed to trucks for monitoring purposes.

Additionally, *70 new [modern] twenty-seater water closet toilet facilities have been constructed in* the Ga South Municipality, Accra Metropolis, La Dade Kotopon Municipality and Ledzokuku Krowor Municipality to serve the communities since many of the households in these communities do not have toilet facilities. Of these, 60 are already in use as at December 2016. The remainder is expected to be open for use in 2017. Also, the city authorities are currently implementing a project where they build toilet facilities for households for half the price of construction. Furthermore, *90 Mechanized Boreholes have been constructed to supply backup water to the toilets.*

Water

Similar to Tema, urban water is not managed by the assemblies in Accra. That notwithstanding, we found that according to an official government publication, Accounting to the People (2015), total supply of water in the entire Region exceeded demand by 2.7 million gallons. Additionally, a total of $48million has been set aside to replace old and weak water infrastructure in Accra and Tema and to lay new pipelines to new settlements in the outskirts of the cities.

Conclusion

Following from our findings, we conclude that a total of $7million will be required annually to maintain sanitation infrastructure and provide municipal services in Tema. This estimate was the amount given by the officials at TMA. In the Case of Accra, we estimate that $4,175,208.75 is required annually to manage sanitation infrastructure and municipal services in the central business district and suburbs under AMA. This however constitutes only 50% of the needs for the city. We therefore project that $8,350,417.5 is required annually for the City of Accra. The estimates given will in some cases extend to some rural communities around these cities since they constitute part of the areas under the metropolitan and municipal assemblies. However, these rural suburbs are expected to become urban in the next decade as the cities expand. Water is not managed by city authorities but reports from national sources revealed that much has been done in water distribution and that there is excess supply of water in the two cities. This was confirmed by city officials in Tema during our interaction with them. Officials in Accra however mentioned that occasionally, slum areas experienced water shortage when a pipeline inthat suburb bursts.

2.3.2 Financing Needs for Road Infrastructure

Tema

Official data obtained from the Urban Roads Department show that the total length of roads in the city is 1690km (Table 2.9). 32% of this is paved road, 43% is gravel earth roads and 25% are missing links. Table below, shows the breakdown of the road network in the city of Tema. They reported that a significant number of the roads have no drains, bicycle or pedestrian facilities. In addition, the existing facilities were in deplorable state. It is however not clear what deplorable means. Our observation, going through parts of the city was that many of the roads were narrow and had large spaces on the sides which were not being used by cars except that a few cars had parked along the roadside.

Table 2.9: Road Network in Tema

Type of road	Length (km)	Percentage
Paved road	545	32
Gravel earth roads	724	43
Missing links	421	25
Total	**1690**	**100**

Source: Department of Urban Roads, Accra. 2016

The budget for maintenance of urban roads for the assembly stood at GHC1,019,913 ($254,978.25). The central government was expected to provide GHC19913 ($4978.25) while the assembly raise the remaining amount through its IGF. Our checks in the accounts of the assembly however shows that, year after year, they are not able to raise up to half of revenues and so they are not able to undertake all the planned maintenance activities. This partly explains why a significant proportion of the roads in the city are deplorable. We estimate that the three year average cost per kilometre of paved road in the metropolis was GHC286317.29 ($71579.33). We arrived at this estimate by dividing the total cost of road constructed in the metropolis by the length of road constructed using data from the annual financial reports and budget of the assembly. We did not include roads that did not have values for length constructed and roads for whose cost was not available. From the table shown above, 1145km of roads require additional work to make them motorable. This means that a total of $81,958,332.85 is required in funding for urban roads in Tema. This will be a one-time expenditure to be complemented by $254,978.25 for maintenance annually.

Accra

In Accra the data obtained for roads was classified as paved and unpaved. The total road network in the Accra Metropolis is 1,617km made up of 884km (55%) paved and 733km (45%) unpaved road networks. Out of this, 15% is Arterial, 15% Collector and Local 70% as the composition of the classes of road. These mainly consist of roads in the central business area and few residential suburbs. There are however adjoining municipalities in the city of Accra whose data was not available. These are mainly residential suburbs. We estimate that the road network in these municipalities is equal to the network in the Accra Metropolis. We arrived at this estimate using the relative land surface covered and the characteristics of these suburbs; the fact that they are mainly residential. Using a total network of 3234km and the cost per kilometre calculated previously, we estimate that a total of $104,169,398.949 is required to pave the 45% unpaved roads.

The total road network in the Accra Metropolis is **1,617km** made up of **884km (55%)** paved and **733km (45%)** unpaved road networks. Out of this, **15%** is Arterial, **15%** Collector and Local **70%** as the composition of the classes of road.

Table 2.10: Road network in Accra Metropolis

Type of road	Length (km)	Percentage
Paved road	1768	55
Unpaved road	1466	45
Total	**3234**	**100**

Source: Authors' computation and Department of Urban Roads, Accra. 2016

2.3.3 Financing Needs for Energy and Power

Like housing and transport, every household has need of energy and power. These include electricity, LPG, solar, fuels and other energy sources. Notwithstanding this, it is estimated that over 600 million Africans representing about 60% of residents on the continent lack access to electricity (USAID, 2014). Businesses need energy and power too. The case of Ghana is above the continent's average. The 2010 housing census revealed that 64.2% of households in Ghana are connected to the national electricity grid compared to 43.7% in 2000. This had improved to 70.6% in 2013 (GLSS6, 2014). The 2010 census further indicated that 83.8% of urban households were connected to electricity and Greater Accra had 87.1% of households being connected to the grid. This improved slightly to 88.6 for all urban areas and to 93.1% for Greater Accra as at 2013 (GLSS6, 2014).

Figure 2.9 Charcoal Is a Common Cooking Fuel in Ghana

As of 2015 the national access was estimated to be 74% and this could reach 90% by 2020 (Power Africa, 2015). 98.4% of the residents of Accra and Tema included in our sample said electricity was their main source of energy/power (Figure 2.47) but 82.3% said they use LPG for cooking (Figure 2.48). It is important to state that expansion of access by rural communities is much slower than urban areas hence the expansion of access is driven by urban areas. Moreover, due to low-income levels, many rural households are unable to afford electrical appliance requiring electricity. This rapid growth in demand is however not matched by generation hence leading to shortages that have led to power rationing or load shedding popular called "dumsor". For most parts of 2013-2015, electricity supply to households were erratic and this is believed to have led to loss of several jobs and a reduction in household standards of living mainly in urban areas such as Kumasi, Accra, Takoradi and Koforidua. Power was rationed on a 12-hour rotation across several urban areas. The northern parts of the country and rural areas were excluded from this rationing (8). The reason given was that the demand by these areas was negligible compared to the southern urban areas (8), about 120 MW or 4% of total national consumption (NEDCo, 2016). 81.1% of the residents of Accra we included in our survey said their electricity supply was either very regular (24.4%) or fairly regular (56.7%) (Table 2.11).

According to the Volta River Authority (VRA, 2016), a government-owned electricity Generation Company, installed capacity of electricity from all power producers in Ghana as at July, 2016 stands at 3,644MW, 3275MW

of which is classified as dependable. This includes both private (27%) and public (73.3%) sector power producers. Hydro generation represents about 55% of dependable capacity. Thermal makes up most of the remainder with solar accounting for about 0.1% (Power Africa, 2015). Thermal plants are run mainly on Light Cycle Oil (LCO), Gas and Distillate Fuel Oil (DFO). Conventional government estimates projects that at the current growth in demand for power, 200MW must be added to the grid annually to meet demand (Power Africa, 2015). In 2016 alone, the government has added about 250MW capacity by acquiring thermal power badges worth about $500million in what it calls emergency power to make up for shortages in order to end "dumsor". However, it has yet to disclose how much of this added capacity is being utilized. Based on reports by the VRA and the Electricity of Ghana (ECG) an additional 1000MW is required to meet demand in the next 5 years. This will cost up to $2billion to provide. Currently the cost of power generation is as follows: Hydro costs 13cents/ kWh for up to 10MW and 11 cents/ kWh for quantities between 10 MW-100MW. Wind energy costs 16 cents/ kWh, Biomass cost 0.15/ kWh and Solar costs 0.20cents/ kWh (Power Africa). The increasing dependence on thermal power means that cost of power will increase in the medium to long term.

Table 2.11: Regularity of Electricity

	(%)
Very regular	24.4
Fairly regular	56.7
Not regular	18.1
Other	.8

Source: Survey Data, 2016

Table 2.12: Average Monthly Electricity Spend

	(%)
Less than GHC 50	18.5
GHC100-150	33.1
GHC150-250	26.6
More than GHC 250	21..8

Source: Survey Data, 2016

Table 2.13: Average Monthly household Spend on other Energy Sources

	(%)
Less than GHC 50	45.3
GHC100-150	29.9
GHC150-250	18.8
More than GHC 250	6.0

Source: Survey Data, 2016

The new approach by the government of Ghana in meeting the energy needs has been to provide incentives for private sector players to be involved in power production. On the distribution side, measures are being put in place by government to engage private firms to take over the running of ECG, the sole distributor of electric power in the southern sector of the country. Distribution in the northern parts is by the Northern Electricity Distribution Company (NEDCo), a subsidiary of VRA. The Ghana Grid Company is responsible for nationwide transmission to distributors.

Other energy forms are in use in Ghana particularly for domestic users. The GLSS6 (2014) revealed that as at 2013 about three out of four households depended on wood or charcoal for cooking while less than one-quarter use LPG (22.3%). Additionally, in the urban areas, 43.6 per cent of households use charcoal while 35.8% use LPG. Usage of wood for cooking by urban households was 7.8% and one out of every two urban households used charcoal as the main cooking fuel. These are traditional cooking fuels in Ghana and the intercensal values indicate a shift away from these traditional energy sources to LPG and Electricity. 82.3% of residents of Accra and Tema we sampled for this report said they use LPG for cooking (Figure 2.49). This shift is motivated partly by government policies that aim to conserve the environment and forests by placing subsidies on electricity and LPG. Meanwhile on average, 78.2% of residents said they spend at most GHC250 ($62.5) each month on electricity and 94% spent a similar amount on other energy sources (Tables 2.10 and 2.11). In each case others spent more than GHC250 on either energy sources.

2.4 Sources and Status of Finance for Housing, Infrastructure and Urban Services

2.4.1 Sources and Status of Finance for Low and Lower-Middle Income Housing

Since 1957, government's policies and efforts to ameliorate the national housing deficit was mainly through, direct construction of housing units, giving soft loans to workers to build houses, or provision of housing subsidies through important State Agencies such as the State Housing Company Limited and the Tema Development Corporation. In addition, it instituted programs such as the Roof and Wall Protection Loans Schemes, Construction of Low-Costtown houses for civil servants and Government Estate Houses (National Housing Policy, 2015). Over the years, these programs proved to be unsustainable.

Mortgage finance as a share of GDP is 80% for UK, 77% for US, 50% for Hong Kong and 32% for Malaysia. In Africa, South Africa has the highest ratio of 32%. It is 2% for Botswana and Ghana and 0.5% for Nigeria. We find corroborating evidence from our sample which showed that only 4.4% of those who owned houses had done so using mortgage or some form of loan (Figure 2.18). This represented 1.5% of the sample. The major source of home finance has been by personal savings or household savings (Figure 2.18). This option is available to only 41.5% of the 58.5% of residents we sampled who said they needed alternative accommodation (Figure 2.21). 57.3% said on their own they cannot currently afford their desired housing conditions (Figure 2.23).

44% of the residents who did not own a home or who want an alternative accommodation indicated that they can afford to rent their ideal housing facilities if it cost GH250 ($62.5) or less to rent per month (Figure 2.25). The others were willing to pay more for their ideal housing conditions. If they had to buy or build their desired housing units, 44.5% of those who needed alternative accommodation could afford a maximum of GHC100, 000 ($25,000). 23.1% more could afford up to GHC250, 000 ($62500) (Figure 2.26). Given the incomes they reported, and the analyses above, it will take up to 15 years for the average person to raise GHC100, 000 if they earned GHC1000 monthly and saved half of their earnings. The housing finance market is explored further in chapter five.

2.4.2 Sources and Status of Finance for Transport

The road sector is financed chiefly through the budget of the Government of Ghana and through support from development partners in the form of loans and grants for road and bridge construction (MOFEP, 2016). Table 2.14 shows the budgetary allocation and the actual disbursements for urban roads for four years. It is important that we find innovative approaches to financing the system to deal with challenges facing both the supply and demand side requirement, mainly to ease congestion and enhance investment in its capacity.

Table 2.14: **Budgetary allocations for urban roads (GHC million)**

Year	2010		2011		2012		2013	
Source	Gov't	Donor	Gov't	Donor	Gov't	Donor	Gov't	Donor
Allocation	125.95	23.98	201.80	16.60	235.54	47.93	53.40	152.10
Actual Disbursements	74.06	21.11	205.87	15.71	135.25	99.75	77.93	5.34
Total Disbursement	**143.54**		**272.59**		**334.76**		**157.54**	

Source: MRH, 2014

For a long while, the government of Ghana has relied on taxes on fuels to finance much of its obligations in the transport system. These taxes offer stability of revenue and are predicable with a comparatively low administrative burden. It is also difficult to evade fuel tax and so this source has generated substantial revenues for the government over years. Moreover, fuel taxes have an added incentive for individuals to acquire fuel-efficient vehicles yielding environmental benefits. The weakness of the current fuel tax is that it does not distinguish between efficient cars and non-efficient cars. Users of efficient cars may travel same mileage as other cars but pay lower equal taxes. Thus if the purpose of fuel tax includes road maintenance then some users may be paying more than others since the current form of fuel taxes does not account for mileage traveled- a factor which has direct impact on the lifespan of roads. Similarly, fuel taxes do not solve the problem of congestion during peak periods. Moreover, electric cars which are now becoming common in Africa would be excluded and drivers who use LPG (LPG is subsidized) will also be excluded from fuel tax.

Chapter 3

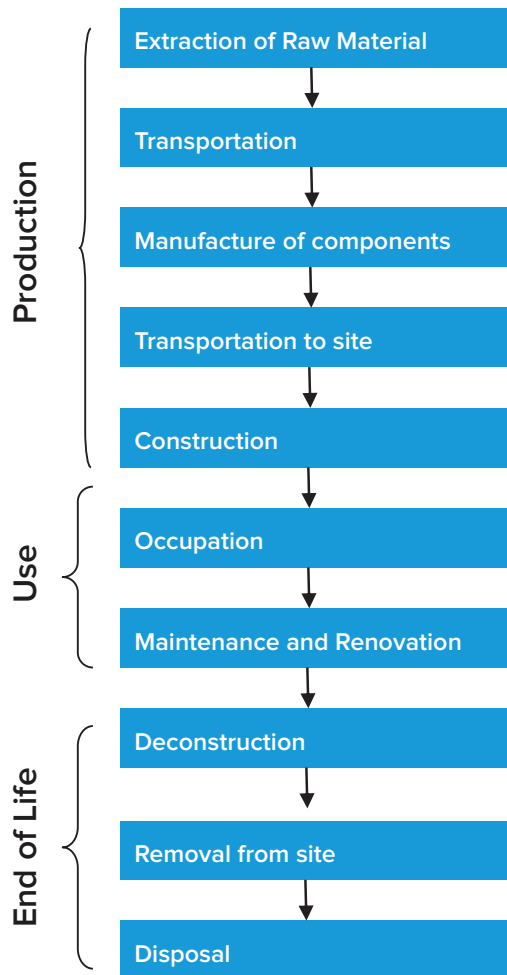## Finance Needs and Status for Resilient and Green Urban Solutions

3.1 Financing Needs for Resilient and Green Housing Development

3.1.1 Green Housing Development – The Concept

Greening housing development requires specific steps or actions at different stages of the housing development process from the choice of site to occupancy and operation of building. The Ghana Green Building Council (GHGBC) identifies five key areas that form the basis of its assessment of the performance of green buildings. Specifically, GHGBC requires green buildings to meet the following requirements. Firstly, the development must be situated on sustainable sites by discouraging development on lands previously undeveloped in favour of those already committed to urban use and more generally encouraging developments that minimize impact on ecosystems and waterways among others. Secondly, developments must incorporate systems that ensure water efficiency either by conserving water through the use of efficient appliances, fixtures and fittings or making use of rainwater harvesting systems. Thirdly, green developments are expected to adopt measures that promote the use of renewable and clean sources of energy and through efficient design and construction, make buildings that consume less energy and rely more on the natural environment. The fourth requirement encourages the use of materials and resources that have little impact on the environment in their production and transportation as well as the avoidance of waste and promotion of product recycling and reuse. Lastly, GHGBC emphasizes indoor environmental quality by encouraging strategies that improve indoor air quality and allow access to sunlight and good ventilation. Generally, there is a convergence in the requirements of GHGBC's requirements and those of other organizations such as the Enterprise Community in the U.S.A.

Housing development technologies, materials, climatic conditions, consumer preferences and norms differ across countries. As result, what works in one country may not necessarily be optimal in another setting. In this section, a detailed review is carried out on the existing practices in the housing development sector in Ghana with the aim of identifying the inefficiencies and specific opportunities for greening the current process of housing development. The building life cycle assessment (LCA) framework provides a useful way to evaluate the conventional methods of housing development with the view to determining the main contributors of green house emissions and other negative environmental effects. This study adopts the simplified lifecycle flow chart provided by Monahan and Powell (2011) as shown in Figure 3.1. Even though LCA covers three key areas, which are production, use and end-of-life, the focus will primarily be on the production and use stages in this study as these two make up the vast majority of building energy use. A study by the United Nations Environment Program under the Sustainable Buildings and Climate Initiative (UNEP-SBCI) indicates that 15% and 85% of total building energy use occur at the production and use stages respectively. Incidentally, the nature of the materials used in the production phase has a direct impact on energy use at the occupation and maintenance stages. In the section that follows, we examine the nature of the existing housing stock in both Accra and Tema with the view to evaluating the sustainability of the main materials of construction.

Figure 3.1: Building Lifecycle Flow Chart

```
           ┌─ Extraction of Raw Material
           │           ↓
           │      Transportation
           │           ↓
Production │  Manufacture of components
           │           ↓
           │   Transportation to site
           │           ↓
           └─     Construction
                       ↓
      ┌─       Occupation
Use   │              ↓
      └─ Maintenance and Renovation
                       ↓
           ┌─   Deconstruction
           │           ↓
End of     │    Removal from site
Life       │           ↓
           └─      Disposal
```

3.1.1.1 The Nature of Existing Housing Stock in Accra and Tema

The 2010 Population and Housing Census (PHC) details the materials of construction for the existing stock of houses in Accra and Tema. The census focused on three key parts of houses; outer wall, floor and roof. As shown in Table 3.1, the predominant material for the construction of outer wall of houses in both cities is cement blocks or concrete and represents about 82% and 76.3 of houses respectively. Of the remaining houses, about 11% and 20% have wood as outer walls whereas a little over 2% use mud brick or earth in Accra but only 0.3% in Tema. Materials such as bamboo, burnt bricks and Raffia are rarely used in constructing outer walls. In Table 3.2, the breakdown of the flooring materials used in constructing houses are presented. Cement/concrete is the flooring material for more than 82% and 73% of houses in Accra and Tema respectively followed by wood or tile depending on the city. In both cities, wood make up about 4% of houses whereas tiles constitute about 14% of flooring materials in Tema but only about 5% in Accra. Table 3.3 presents the materials for roofing in the cities. Slate/asbestos and metal sheets serve as the roofing material for about 47% and 45% of houses in Accra.

In the city of Tema, however, metal sheets constitute about 60% of roofing material with slate/asbestos making up about 28%. Concrete and roof tiles constitute about 4% (6%) and 1% (3%) of roofing materials for Accra (Tema). The differences in the extent of use of the various construction materials is largely a reflection of the fact that Tema is a relatively newer city and has a higher concentration of formal housing. Not surprisingly, the more recent published Ghana Living Standards Survey (GLSS, 2014), reports even a higher percentage (91.5%) of houses constructed with cement blocks or concrete in the GAMA area, which includes both cities. A similar higher percentage (82.6% and 76.8%) of houses uses cement/concrete and metal sheets for flooring and roof respectively.

Table 3. 1 Materials of Construction for Outer Walls of Existing Houses in Accra and Tema

Material	Percentage	
	Accra	Tema
Cement Block/Concrete	82.1	76.3
Wood	11.3	19.8
Mud brick/Earth	2.3	0.3
Metal sheet/Slate/Asbestos	1.6	1.1
Burnt bricks	0.4	0.3
Stone	0.3	0.2
Landcrete	0.3	0.5
Bamboo	0.1	0.1
Palm leaf/Thatch/Raffia	0.1	0.1
Others	1.6	1.3

Source: Ghana Statistical Service, 2010 Population and Housing Census

Table 3.2: Materials of Construction for Floor of Existing Houses in Accra and Tema

Material	Percentage	
	Accra	Tema
Cement/Concrete	82.6	73.2
Tiles	4.8	14.2
Wood	4.3	4.4
Earth/Mud	4.0	2.1
Terrazzo	3.2	5.0
Stone	0.5	0.5
Burnt bricks	0.2	0.3
Others	0.4	0.4

Source: Ghana Statistical Service, 2010 Population and Housing Census

Table 3.3 Materials of Construction for Roofing of Existing Houses in Accra and Tema

Material	Percentage	
	Accra	Tema
Slate/Asbestos	47.2	28.2
Metal sheet	45.1	59.9
Cement/Concrete	4.0	6.3
Roofing tile	1.0	2.8
Wood	1.0	1.0
Palm leaf/Thatch/Raffia	0.4	0.3
Mud brick/Earth	0.3	0.3
Bamboo	0.2	0.3
Others	0.9	0.8

Source: Ghana Statistical Service, 2010 Population and Housing Census

It is very clear from the foregoing that the main materials used in the construction of houses especially floors and outer walls in both cities are cement-based products. There are two implications of this state of affairs. First, the over-reliance on cement has cost implications and consequently the affordability of houses. Cement is a relatively expensive material compared to other locally sourced materials such as wood, bamboo or earth due largely to the fact that most of the raw materials used in cement manufacturing in Ghana are imported. Secondly, the use of cement in the construction of houses impacts on the environment more negatively as its manufacture, transport and use require high energy consumption. In essence, the housing development sector is characterized by the over-reliance on a material that is costly and not very environmentally friendly.

### 3.1.1.2 Sustainability of Predominant Building Materials

Bribian et al (2011) assess a variety of building materials including cement/concrete, wood, bricks etc. using the LCA framework. They argue that the materials used for the structure of buildings constitute more than 50% of the embodied energy in the building implying that efforts at reducing the negative effect of buildings on the environment must begin with the materials used in building construction. Figure 3.2 , adapted from Bribian et al (2011), shows the contribution the manufacture of several buildings materials make to CO_2 emissions. Interestingly, cement contributes the most to CO_2 emissions followed by ceramic products whiles wood and prefabricated concrete make minimal contribution to emissions. In a similar study by Pulselli et al (2007), they find concrete to have the most environmental impact of the materials they assessed.

Even though, current building practices are unsustainable and costly, there are no clearly defined tools or policies to transition to a more greener built environment. In both cities, there are no incentives to encourage developers to use more environmentally friendly materials neither are there any penalties or disincentives in the continuous use of the cement-based materials. For instance, the use of the tax code

to grant tax credits for green developments could be explored by the cities as a way of incentivizing green developments.

The Building and Road Research Institute (BRRI), a unit of the Council for Scientific and Industrial Research (CSIR) have over the years made efforts to develop locally-based alternative buildings materials that can replace the conventional materials. The greatest challenge the Institute has faced is the lack of interest from both the public and private sectors in making the shift to more sustainable materials.

Figure 3.2: Contribution of CO_2 emissions associated with the manufacture of building materials
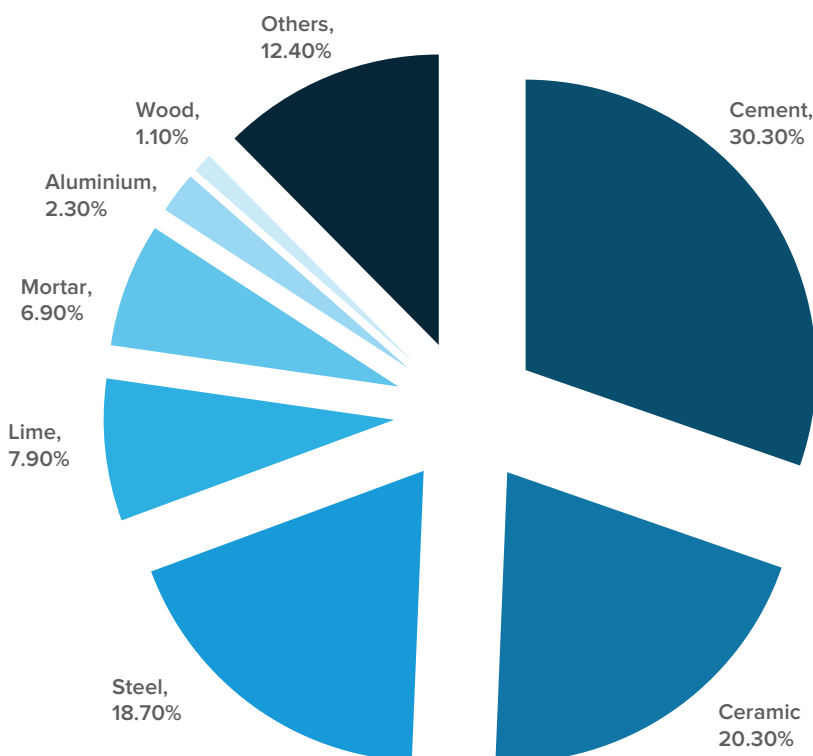
Source: Adapted from Bribian et al (2011)

3.1.1.3 The Cost Implication of Green Developments

One of the major barriers to the adoption of green building practices is the perception that they are more costly than conventional buildings. In reality, however, it is the initial cost that is often higher for green buildings. The higher initial cost must be considered as a down payment for potential savings in the cost of operations over the life of the building. In a 2012 study by Enterprise Community in the USA, it was estimated that the median increase in total development cost resulting from the adoption of green practices is 2%. The study, on the other hand, points out that the lifetime utility savings of incorporating green features exceed the cost of implementing the green measures. Further, the simple payback period was estimated to be 5.59 years. Even though no such comprehensive study has been conducted on the incremental cost of green building in Ghana, initial estimates given by the CEO of GHGBC is between 3 – 10%. Certainly, a lot more needs to be done to demonstrate the costs and benefits of engaging in green housing developments in both cities.

Unfortunately, the combination of high cost of construction, low incomes and the excessive cost of funds have made households very price sensitive. Consequently, the incremental cost of adopting green features has to be low enough so as not to make the cost of such houses prohibitive even if the lifetime utility savings would end up exceeding the costs.

3.1.2 Financing Needs for Resilient and Green Infrastructure Development
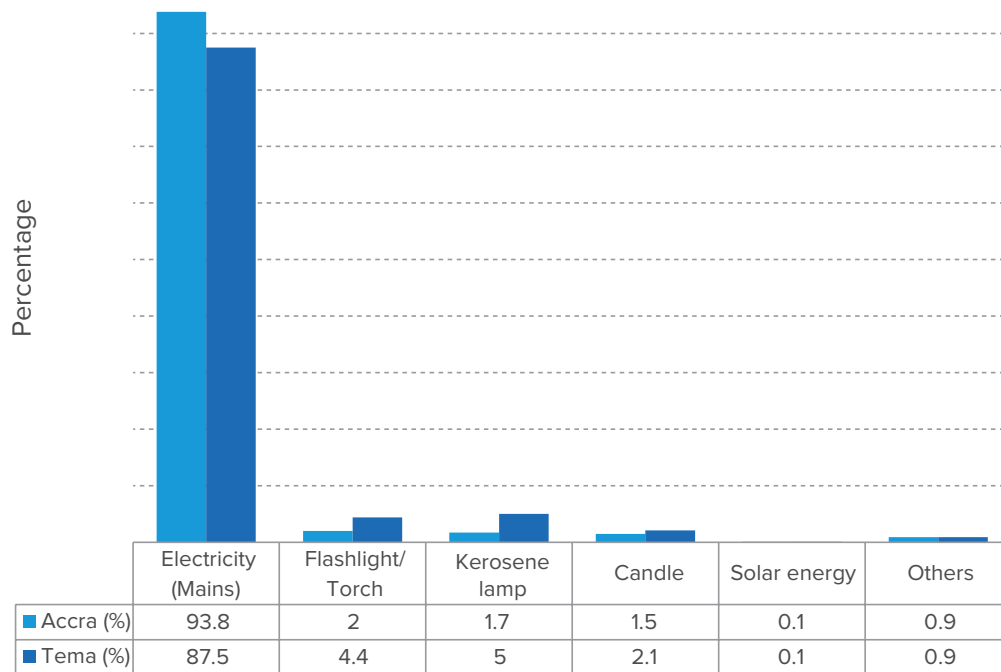
3.1.2.1 Energy

One of the main goals of Ghana's energy policy is to increase the proportion of renewable energy in the total national mix and ensure its efficient production and use. The policy focuses on four main renewable energy resources: biomass, mini-hydro, solar and wind. Figure 3.3 presents the power generation mix for the country and shows that besides hydro, which represents 43% of installed capacity, other renewable sources such solar constitute only 0.6% of power generation. Since power generation is centralized, the situation at the city level will only be a reflection of what pertains nationally. The 2010 PHC provides further indication of the sources of energy for households. The census focuses on two uses of energy at the household level: lighting and cooking fuel. As shown in Figure 3.4, an overwhelming majority of households (93.8% and 87.5%) in Accra and Tema rely on electricity from the public mains for lighting with solar energy accounting for only 0.1%. It is ironic that in cities where sunshine is available throughout the year, solar energy plays such an insignificant role in household energy use. In the case of cooking fuel, about 41% and 52% of households rely on gas in Accra and Tema respectively whereas almost 46% and 42% use charcoal.

Figure 3.3: Installed Electricity Generation Mix as at Dec 31, 2015
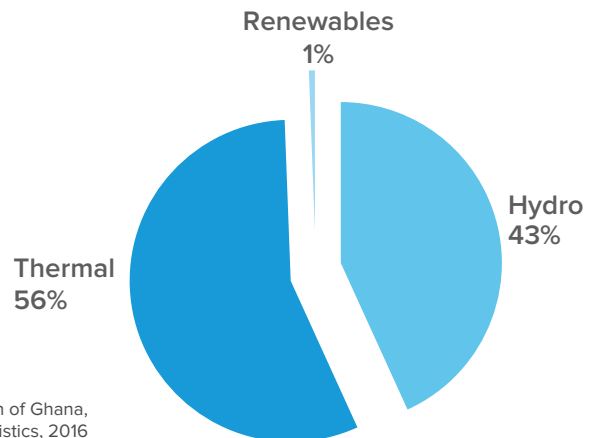
Source: Energy Commission of Ghana, National Energy Statistics, 2016

Figure 3.4 Households' Source of Energy for Lighting

	Electricity (Mains)	Flashlight/ Torch	Kerosene lamp	Candle	Solar energy	Others
■ Accra (%)	93.8	2	1.7	1.5	0.1	0.9
■ Tema (%)	87.5	4.4	5	2.1	0.1	0.9

Source: Ghana Statistical Service, 2010 Population and Housing Census

3.1.2.2 Transport

Accessibility is central to land use decisions by households and the availability of an efficient transport infrastructure and services is pivotal in ensuring access to workplaces, schools, health facilities and other social and economic services. The second National Household Transport Survey (NHTS) report provides a picture of the transportation situation across the country. Table 3.4 reports the major means of travel as revealed in the NHTS. Besides travelling on foot, which constitutes about 47% of all travels to and from workplaces in urban areas, the use of trotros (mini buses) and shared taxis are the two other major means of travel with both representing 19% and 12% respectively. Interestingly, only 1.2% of urban residents use bus as a means of transport. In fact, the transport landscape of Accra and other urban areas is characterized by large amounts of privately owned and operated mini buses and taxis that have relatively lower occupancy levels compared to buses or trains. Furthermore, the presence of these mini buses and taxis, which are often old and not in very

good condition, on the roads is one of the reasons for the severe traffic congestion in the city. Not surprisingly, it is estimated that about 70% of total emissions in Ghana emanate from passenger vehicles (National Transport Policy, 2008)

The National Transport Policy document, which was launched in 2008, aims to prioritize mass transportation so it can move at least 80% of passengers in urban areas. There seems to be a huge gap between what the policy seeks to achieve and the situation as at 2012 when the NHTS report was presented. Admittedly, some of the specific strategies such as the implementation of the Bus Rapid Transit (BRT) system are currently underway in Accra and the proportion of passengers using mass transportation systems may improve. Notwithstanding these efforts, Accra still requires a lot of investment in mass transportation infrastructure especially in rail transport, which is virtually non-existent currently.

Table 3.4: Means of Travel to Workplaces in Urban Areas

Means of travel	Percentage
On foot	47.4
Vehicle (Trotro)	19.0
Taxi	14.9
Private car	5.7
Bicycle	5.1
Motorcycle	4.1
Bus	1.2
Others	2.6

Source: Second National Household Transport Survey, 2012

3.1.2.3 Water

Daily water consumption per capita is about 30 gallons. Historically, the cities have faced a supply deficit in water production but recent investments in expansion of treatment plants seem to have somewhat alleviated the problem, at least in the near term. Daily production at the Accra Tema Metropolitan area (ATMA) systems of the Ghana Water Company is presently estimated at 160 million gallons whereas total demand including those by industry is pegged at 157 million gallons implying a surplus of about 3 million gallons. It must, however, be stressed that major problems in the distribution to households persist and this must be addressed to ensure that the recent gains reflect in improved household access to water.

Households consume water for two main purposes: drinking and other domestic uses such as washing, bathing etc. Pipe-borne water is the source of drinking water for about 60% of households in Accra whereas sachet water (produced by small to medium scale enterprises) is the source for about 28% of households. In Tema, the situation is somewhat different with about two-thirds of households relying on pipe-borne water and only 6.5% using sachet water. The use of sachet water has an obvious environmental implication as it contributes significantly to the plastic waste problem the cities face. Of the households that rely on pipe-borne water, only about half obtain their drinking water from within their premises in Accra whereas about two-thirds

of households with access to pipe-borne water in Tema have it within their premises. The rest have to fetch water from outside their premises often from standing pipes. Paradoxically, the lower to middle-income households who tend to obtain water either from standing pipes or tanker services pay more for water than those who receive water directly from the public mains. The predominant source of water for other domestic uses is pipe-borne and it accounts for more than 84% of households.

Strikingly, only a tiny percentage (0.03%) of households relies on rainwater as a source of water for any purpose. This is in sharp contrast to the goal of the national water policy to make rainwater harvesting a key part of households' water consumption. The cities experience an appreciable amount of rainfall and with the appropriate rainwater harvesting technology adequate amounts of water could be obtained for household use. This will not only provide reliable water for households and reduce demand on water resources but also has the potential of reducing household expenditure on water.

3.1.2.4 Waste Management

Together, the two cities generate about 3,600 tonnes of solid waste daily, which translate into about 1.5kg/person/day. Apart from the 15% of waste that is recycled, the bulk of waste generated in both cities is dumped into landfill sites. However, in line with global trends toward recycling of waste, there are clear statements of intent to dramatically increase the proportion

of waste recycled. The strategy is to encourage the private sector to set up waste recycling plants and already a number of such plants have been announced in recent times.

Accra has been grappling with waste management problems for several decades. According to the 2016 composite budget of the Accra Metropolitan Assembly the city generates about 3,000 tonnes of solid waste daily out of which about 80% is collected and transported to dumpsites managed by the Metropolitan Assembly. Apart from the Accra Compost and Recycling Plant (ACARP), which recycles less than 15% of waste generated in the city, waste management in Accra principally involves collecting and dumping waste into landfill sites. The 20% of the solid waste that the city is unable to collect are either burnt or find their way into drains, or as litter on pavements or as heaps around the city. The management of liquid waste is even more precarious in Accra as the existing sewerage system, which is considered obsolete and in a state of disrepair, only covers 15% of the city. Majority of households dispose of liquid waste either into open gutters or on the street. These unhealthy practices are a source of concern as they are at the root of the outbreak of diseases such as cholera.

Unlike Accra, the city of Tema relies mainly on a centralized sewerage system in managing liquid waste. The system, which was established in 1960, requires major rehabilitation to ensure efficiency and prevent the frequent blockages and effluent discharges onto streets and drains. In the management of solid waste, however, the city engages private waste management companies to collect, transport and dispose of waste from households, who in turn are required to pay approved fees to the waste collectors.

The city of Accra is planning to transition to a waste-to-energy system of waste management and is therefore seeking for investment to make this happen. Inasmuch as a waste-to-energy aspiration is a good one, a more comprehensive strategy that focuses on the three key principles of sustainable management of solid waste – reduce, reuse, recycle- is required.

3.2 Current Financing Sources for Resilient and Green Urban Solutions

As already noted, the lack of full decentralization of government functions has rendered most municipal and metropolitan Authorities incapable of handling the responsibility of providing basic urban services such as transportation, housing, water and energy. The only function that appears somewhat fully decentralized is waste management. Both AMA and TMA are responsible for managing solid and liquid waste in their areas of jurisdiction. Consequently, the only urban service for which the two Assemblies have direct control with regards to financial flows is waste management.

Generally, the two cities have adopted the polluter pay principle as a way of easing the severe burden waste management imposes on their finances. The AMA, for instance, estimates that only 40% of residents currently pay for the cost of waste collection forcing the city to find resources to cater for the remaining 60%. The lack of effective waste management and the associated environmental hazards that threatens life in the city is largely due to the huge financing gap. Figures 3.5 and 3.6 show the sources of funds for waste management in both cities as indicated in their composite budgets for the periods 2014 - 2016. As the figures show, the most stable source of funds is internally generated fund (IGF). Government of Ghana transfers and Donor funds are very vital sources for Tema as opposed to the city of Accra. These two sources are, however, do not provide a consistent source and it is important that the cities strengthen their capacities to mobilize funds internally to meet their waste management needs. It is instructive to note that both cities seem to have recognized the need to rely more on internally generated funds as revealed in the 2016 estimates. Of the total sum required for 2016 for AMA, almost 78% is from internally generated sources while 15% is obtained from transfers from the central government. Only about 7% of the estimated required financing is from donor sources. Even though the picture is quite different for TMA as donor fund dominate, there is still an appreciable increase (more than 50%) in the funds generated internally from the 2015 figure.

Figure 3.5: Sources of Funds for Waste Management for AMA: 2014 - 2016
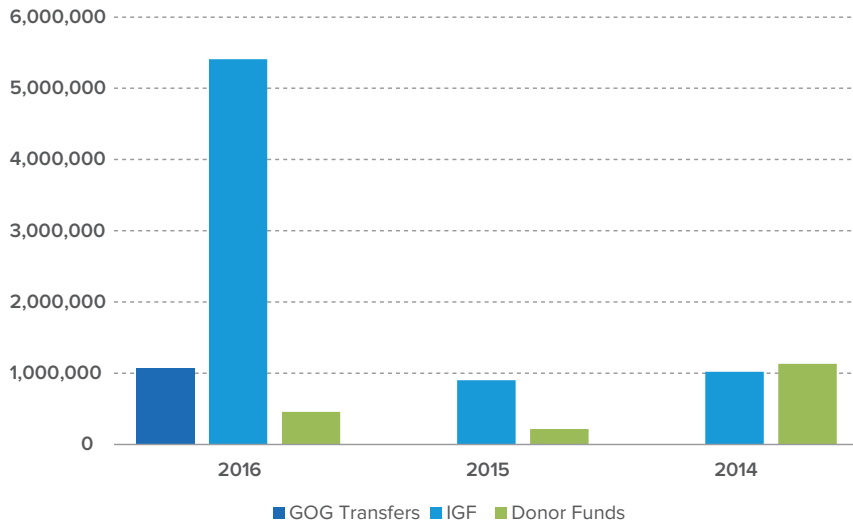
Source: AMA Composite Budgets for 2014, 2015 and 2016

Figure 3.6: Sources of Funds for Waste Management for TMA: 2014 - 2016
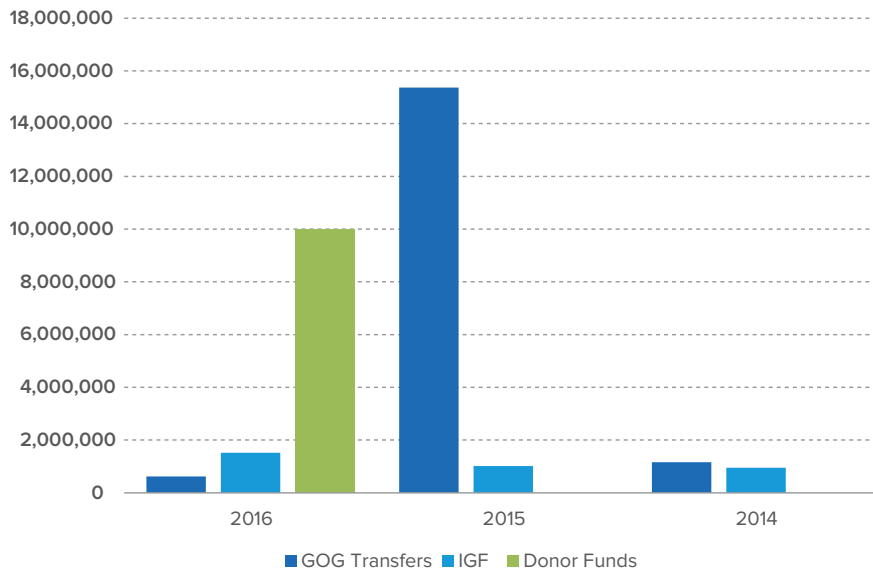
Source: TMA Composite Budgets for 2014, 2015 and 2016

Chapter 4

Financing Instruments for Housing, Infrastructure and Urban Services

4.1 Housing Finance in Ghana

The most basic needs of any individual especially those who find themselves in developing countries include food, clothing and shelter. Shelter or housing however, seems to take a chunk of people's income especially low and middle income earners in the form of rent, buying a house outright or mortgage which requires periodic but regular payments. Housing needs is therefore of outmost concern since a bulk of households income goes into it beside the fact that houses serve as prestige and source of household wealth. Literature suggests that housing needs take precedence over education and healthcare in most African countries and hence how this important need is financed should be of concern to all stakeholders and policy makers.

The high housing deficit in Ghana is expected to create opportunities for private real estate developers and other stakeholders to invest hugely in the sector but due to the high interest rate charges and short gestation period of loans (up to 3 years), coupled with very low income of prospective homeowners, investment in the sector is far below expectation. For example, an estimated 133,000 housing units were required annually in the early 2000s but only 25,000 units were provided resulting in large housing deficits annually and Ghana's housing requirement by 2020 stands at 5.7 million new rooms, requiring 3.8 new rooms in every minute of the working day for ten years to meet this deficit (UN Habitat, 2011).

4.1.1 Key Challenges and Constraints in Financing the Housing Sector

An efficiently functioning housing finance industry provides funds on the supply side to real estate developers and mortgage on the demand side to prospective homeowners to acquire these properties. A major challenge facing the housing finance market of Ghana stems from its underdevelopment. Though Ghana seems to have been on track in macroeconomic stability after independence in 1957, series of coups led to its instability in the late 1960s through to the 1980s. In addition, poor economic management have

had serious tolls on the financial system hence affecting banks that had dreams of financing the housing sector. The Centre for Affordable Housing Finance in Africa (CAHF) in its 2016 report enumerated macroeconomic shortfalls such as high debt-to GDP ratio, high inflation rates, ever-increasing interest rate, low economic growth rate and depreciation of the Ghanaian cedi against the major currencies especially the US dollar to be responsible for the slow pace of the housing finance industry.

The interest of financial institutions in financing housing products is on the low side. Thus, most banks or financial institutions in Ghana do not have housing finance schemes as part of their strategic plans. This is due mainly to the long term nature of such loans and the high default rates among borrowers. Of the total 26 bank financial institutions that operate in Ghana, only 5 readily offer mortgage services or products to clients. These include HFC Bank, Stanbic Bank, Fidelity Bank, Cal Bank and UT Bank (CAHF, 2016). Others such as Barclays Bank and GCB Bank also do offer mortgage services. Ghana Home Loans (GHL) which is a non-bank financial institution is the largest mortgage lender in Ghana with a portfolio of about USD 84 million and a market share of 47% (GHL, 2013). Its closest contender though a bank financial institution, is HFC Bank with a portfolio of USD 47 million and a market share of 27%. This was confirmed in our survey where almost all financial institutions and real estate companies surveyed, considered GHL as the leading residential mortgage provider in the housing finance sector in Ghana. GHL however, only has two branches in Accra and Kumasi. Also, both GHL and HFC Bank only have mortgages for middle income to high income earners. An individual household is expected to be on a minimum monthly net salary of GH¢ 4,000 ≈ USD 1,000, to qualify for the least home purchase product.

The main source of funds available to the few bank financial institutions involved in housing finance in Ghana is customer deposits in the form of savings and investments and also shareholder's funds. Non-bank financial institutions such as Ghana Home Loans (GHL)

on the other hand solicit funds mainly from external partners and also rely partly on firm equity. The sources of funds to the majority of financial institutions is on short to medium term basis, and so they find it difficult to on-lend to individuals, institutions and real estate companies on long term basis; a probable reason for the low participation in the housing finance market.

From the perspective of the real estate developers, the key challenge in financing the housing sector has to do with difficulty in accessing funds due to high interest rates charges by financial institutions on loans with short repayment period. The reason for this is the high inflation rates and exchange rate instability in Ghana. This has ripple effects on the number of houses they put up.

Financial institutions that are involved in the housing finance market were asked in a survey to rank the top five challenges that confront the housing finance industry in Ghana with 1 being the most pressing challenge and 5 being the least. Low income levels in Ghana to acquire mortgage and loans, dominated the chart with an average rank of 1.3.

Another challenge that seems pressing is low demand for mortgage products in Ghana with a mean rank of 2.75 whilst high lending interest rates, high level of bureaucratic procedures in title and property registration and ever increasing property prices filled the lower ranks. Low demand stems from the low income and since there is low demand, home builders are not willing to put up more of such houses. Other challenges found in literature such as inability to get access to long term funds for lending, difficulty of foreclosures and high level of regulation in the housing finance sector didn't seem to be much of a bother to Ghana's infant housing finance industry.

Financial institutions are reluctant in financing the housing sector mainly because of high default risk and clients' inability to provide adequate collateral when demanded though only in exceptional cases. Also, the properties acquired with the credit facilities which are mostly used as collateral are not liquid. To qualify for a mortgage, the applicant is required to make a down payment of at least 20% of the property value, which becomes a big hindrance to a number of people. Also most housing finance institutions seem to be preoccupied with offering first time purchase or home purchase mortgage as their only product which also happens to be the most expensive of all the housing finance products.

Another challenge facing financing the housing sector of Ghana is the ever increasing property prices fueled by high inflation causing the rise in prices of the materials used in putting up these houses. Also related is the unfavourable exchange rate due to the inputs imported from abroad and housing prices quoted in foreign currencies which changes very often when converted to local currencies due to unstable macroeconomic environment. In addition, rapid urbanization, growing middle class resulting into high demand for houses at the expense of limited supply is a probable challenge bearing in the mind the fact that the banks are unwilling to provide mortgage facilities which is in the long term. This is evident in a 2007 research report by Bank of Ghana which puts the housing needs of Ghana at one million housing units in the next decade.

Afrane et al. (2014) noted that the challenges confronting the housing finance industry in Ghana are summed up in two; the issue of unavailable long term funds for lending to middle and low income earners and high interest charges for mortgages which averages 30%. This mostly leads to pricing-out of the low and middle income earners from the formal financial market though it is evident that they constitute the bulk of the population.

4.2 Financial Instruments for Housing

Financing Instruments refers to assets that can be traded and creates an avenue for the flow of capital. These documents are assigned a monetary value but can either be virtual or real so long as they are legal. Financial instruments could be equity-based or debt-based. Financial instruments for housing are assets that facilitate the development and acquisition of a property or a home.

Challenges confronting the housing finance industry in Ghana are summed up in two;

- **The issue of unavailable long term funds for lending to middle and low income earners**

- **High interest charges for mortgages which averages 30%.**

The desire to acquire a property be it for residential or commercial purposes can be met three ways; to build, use a mortgage or to rent. Also there is ample evidence to the fact that, households use an average of 5-15 years to complete their house in Ghana usually with sweat equity or personal funds. With the ever increasing prices of inputs, most building projects never see light of day and hence are abandoned. This means that funds which could have been channelled into productive use are tied up in these projects. This presupposes that mortgage usage and its availability is critical for the housing industry.

4.2.1 Assessment of Financing Instruments for Formal Housing

The main financing instrument for housing, especially with regards to formal housing is called a mortgage. Studies show that the most reliable and superior form of home finance in developed countries is mortgage. Mortgage usage is widespread in advanced economies to the extent that mortgage is synonymous to homeownership. It has also been established that an efficient mortgage market has the potential to deliver houses at affordable rates thereby increasing the number of people who acquire properties through such means. Though, it is superior and more efficient than other housing finance instruments, its demand in Ghana is on the low side, due to high mortgage interest rates and low income levels, as indicated under the challenges facing financing the housing sector. The mortgage market in Ghana has been in existence since 1956 (Afrane et al., 2014), but still far from developed.

The depth of mortgage usage or mortgage market development is measured by the ratio of mortgage debt outstanding to the GDP of the country concerned. A 2007 Bank of Ghana report identified Ghana's mortgage debt to GDP as at 2006 to be at 3.9% up from 2.5% in 2004 which compares unfavourably with other middle income countries which ranges between 7% -15%. Also the terms and condition associated with mortgages are cumbersome for the average Ghanaian, a probable reason for its underutilization. The main financial challenge faced in Ghana is the absence of

long term finance for housing projects or high interest charges associated with the limited available home finance.

Financing instruments available and accessible to real estate organizations include bank loans, deposit from clients, firm equity, microfinance housing loans and foreign funds. Aside the firm's own equity, the most widely accessible financing instrument is deposit from clients. Thus, prospective homeowners pre-finance the house they intend to own by depositing a substantial amount of the property price with the real estate companies. Other real estate companies borrow from banks (loans) locally whilst others have external partners they deal with. It should be mentioned however that, real estate firms' access to funds largely depends on the size of the firm, number of years it has been in operation and ownership structure. Larger firms, firms that have been in operation for longer periods and firms that are companies and not owned by one man are more entitled to larger credit facilities at lower interest rates because of the probability of low default.

The financing instruments that most housing finance institutions in Ghana have for the formal sector are basically loans and mortgages. The loans are usually bank loans or loans from microfinance institutions. Mortgage however, happens to be the most efficient and superior form of housing finance available (BOG, 2007). It is widespread in the advanced countries and almost synonymous to homeownership but the same cannot be said in developing countries like Ghana.

The institutions involved in housing finance in Ghana comprise mainly of commercial banks, lending institutions, insurance companies, and pension trustees. These include HFC Bank, Stanbic Bank, Fidelity Bank, Cal Bank, UT Bank, Barclays Bank, GCB Bank and Ghana Home Loans (GHL). There are also few microfinance institutions involved in housing finance in Ghana. A typical example of financial institution involved in giving out loans for housing finance in Ghana is ASN Financial Services Limited which has been in operation as a financial institution for the past decade but its home finance sector is just two years old. They have home purchase mortgage for prospective

homeowners and they have their own real estate company that puts up houses for sale. The mortgage acquired from them can only be used for the houses they have constructed. They operate a Home Investment Fund which is a medium to long term investment account which allows investors to invest towards their initial deposit for home ownership for a maximum period of 5 years which should total the clients initial 20% deposit. The challenge with this micro finance institution however is that the housing finance product they offer is home purchase mortgage and principally for the upper middle and higher income earners (i.e. a minimum monthly net salary of 4,000 Ghana cedis).

Insurance companies especially those who are into life insurance also serve as a source of housing finance primarily because of long investment horizon of their funds. Life insurance companies accept periodic deposit from clients and make payments upon happening of events. They are more able to pool funds over a longer term for residential construction because the funds available at their disposal are only dispatched upon happenings of eventualities. So until the events occur, the funds could be used for other purposes.

4.2.2 Financing Sources and Flows for Formal Housing

According to the GLSS 6, only 1.1% (0.7%) of houses owned in Accra (other urban areas) are purchased through formal housing finance instruments such as mortgage. Housing financing requires substantial capital investment which yields return but possibly in the distant future because of the long process from land acquisition to sale of property. Nkyi (2012) indicate that only 2% of loans advanced by local financial institutions is directed towards housing finance. A bulk of their loan goes into either commerce (27%) or manufacturing sector (22%). Most real estate companies use bank loans, firm equity, foreign loans and deposits from clients to run their businesses. They are open to both individuals and corporate bodies, they mostly serve corporate entities or middle to high class formal sector workers such as

bankers, lawyers, engineers etc. These clients usually make payment using outright cash settlements, deposit with periodic payments or mortgage.

To be able to put up houses require substantial amount of investment. Getting access to finance however largely depends on the size of the real estate company. Large real estate companies are seen to be less prone to default than smaller ones hence getting easy access to long term funds. This leaves the infant real estate companies to rely solely on the firm's equity or customer deposit, an indicator of an underdeveloped financial market. Some property developers for instance mentioned that they do not even contract loans but rely only on customer's deposits to build for them or deal directly with large corporate bodies.

Other forms of facilities come from mortgage and loans from pension funds, credit unions, building societies, mortgage companies, merchant banks and commercial banks (Nkyi and Dinye, 2013).

One source of finance available for formal housing in Ghana is pension. An Institution that has actively been involved in residential and estate development is SSNIT. A large number of students' hostels has been constructed through SSNIT initiative. In addition, the tier 2 and 3 contributions of members of SSNIT can serve as an asset for collateral in the unlikely event of default when a mortgage for a house is secured. i.e the tier 2 is available for the payment of lump sum benefits in the future and can serve as a collateral for a home mortgage.

One major source of finance available for buildings is remittances from abroad and funds from the global financial market at cheap interest rates which are usually available to non-resident Ghanaians. These funds usually are tied to good economic performance of Ghana and so in the event of weak economic signs, these flows decline. i. e. most non-resident Ghanaians go for these facilities and invest in the housing market. The recent global economic meltdown reduced the remittances to most African countries and Ghana is no exception.

1.1%

only of the houses owned in Accra (other urban areas) are purchased through formal housing finance instruments such as mortgage.

Government intervention has led to the establishment of Home Finance Company that provides secondary mortgage to any one or company interested in purchasing houses provided by real estate developers. The predominant form of home financing in Ghana are informal sources of financing, personal funds (sweat equity), barter arrangements and remittance from abroad (Nkyi and Dinye, 2013). Findings of Nkyi and Dinye (2013) indicates that real estate developers obtain their finance mainly through commercial Banks, advance deposits of prospective clients, merchant banks, On the supply side, high interest rates, high cost of acquiring land and the cumbersomeness in registering lands, high cost of building materials etc results to high prices. The high cost of building materials is probably due to high import bill stemming from unstable currency depreciation.

4.2.3 Assessment of financing instruments for lower and lower middle income population

There is a greater need to search for sustainable housing finance options for the average Ghanaian citizen. Mortgage which happens to be the most efficient form of housing finance in the world and most especially in the advanced countries seems to be highly priced and hence unaffordable by the average Ghanaian. In fact most middle income and low income earners are priced out of the formal mortgage market principally due to low incomes. The Table below depicts the minimum required net monthly income required by financial institutions in Ghana to qualify for the least form of residential home purchase mortgage.

Based on the Ghana statistical service estimates from the GLSS 6, the mean annual per capita income in urban areas (Accra) in Ghana is GH¢ 7, 019.72 (GH¢ 5,603.23). A simple extrapolation, results to an average monthly income of GH¢ 584.98 in urban areas and GH¢ 466.94 in Accra. This figure is not too different from the World Bank's 2015 estimate of Ghana's GDP per capita income which hovers around USD1,381.412 (current equivalent of GH¢ 448.825 per month). Even the highest mean annual per capita income or the average for the highest earners which is the fifth quintile (highest) in Ghana is GH¢ 10,492.6 (monthly income of GH¢ 874.38). With an average minimum monthly net income of GH¢ 3,500 – GH¢ 4,000 required by most financial institutions in Ghana, the average Ghanaian cannot afford a house with formal financing source. This means that middle income and lower income earners cannot afford these properties and only left to few high-income earners.

Table 4.1 Income bands and corresponding credit terms

Name of Institution	Minimum net income	Interest rates (GH¢)	Interest rates (USD)	Repayment period	Maximum level of finance
Ghana Home Loans	GH¢ 3,500 – GH¢ 4,000	31.4% - 34.44%	12.5% - 18%	10 – 15 years	80%
HFC Bank	GH¢ 2,200 – GH¢ 4,000	29%	13.5%	20 years	80%
ASN Financial Services Ltd	GH¢ 4,000 and above	15%	-	10 – 20 years	80%
Fidelity Bank Ltd	GH¢ 3,500 and above	-	9% - 15%	15 years	80%
Stanbic Bank Ghana Ltd	GH¢ 4,000	30%	13%	5 - 20 years	80%
CAL Bank	GH¢ 3,000 – GH¢ 5,000	29% - 31.5%	-	5 – 15 years	85%

Source: Field survey, 2016

Evidence (Boamah, 2009) suggests that, a reasonable number of Ghanaians use their own resources in terms of personal finance, sweat equity and remittances from relatives and friends abroad to build their houses. The challenge with this approach is that it takes a very long time sometimes up to 15 years to complete whilst some are abandoned and some others die and leave the property uncompleted making this approach almost ineffective.

There are rarely any housing finance products for low and middle-income Ghanaians. Most are priced-out due to low incomes etc. The SSNIT tier 2 and tier 3 serves as a form of collateral for securing a mortgage for a house prior to retirement. Thus, SSNIT formal sector contributors can use their lump sum pension equity as collateral to secure a home. This should serve as a form of descent housing financing source or opportunity for lower and middle-income Ghanaians.

Also, the second tier pension scheme could serve as a source of long-term finance mitigating the risks inherent in using customer's short term savings deposits for long-term housing financing by most institutions. This will reduce the liquidity risk and maturity mismatch and subsequently reduce the mortgage interest rate which is probably too high due to high default rates giving more people the opportunity to afford their dream homes.

Related to the pension benefit being used as collateral, the staffs of Ghana Revenue Authority (GRA) for example have a project on-going that entitles them to have their own houses before retirement. The project is a collaboration between the Public Services Workers Union (PSWU) of GRA, ACEC Investment Limited and the United Pension Trustees (UPT). This initiative and foresight by the workers union covers more than 800 staffs and will ensure that houses are built by ACEC Investment Limited for staffs who own lands at designated places and repayment deducted from members' salaries with their pension benefits serving as down payment and/or collateral over a repayment period of 10 years. This project does not only cover those who own lands, but also those who have

started building but lack the necessary funds to complete them.

4.2.4 Financing sources and flows for lower and lower middle-income population

Personal loans: with the ever growing micro finance institutions and lower and middle class and a lot of people operating in the informal sector, it is imperative to look at how micro finance loans can be of assistance.

Most houses sold or produced by private developers are out of the reach of the lower class and sometimes middle class in Ghana. Even with the upper middle-income earners, it takes quite a number of years to settle the bills with consistent income sources. i.e. most private developers do not even target the lower class in their home provision. Almost all financial institutions in Ghana that are into housing finance do not have any form of housing finance product for low-income class and lower middle-income class in Ghana. Most of them require a minimum net salary of 4000 GhanaCedis to qualify for a home purchase mortgage at a variable interest rate which ranges between 15% - 35% for Cedis denominated loans and 9% - 18% for dollar-denominated loans.

Statistics show that, about two-thirds of people living in developing countries live in rented apartment and are not homeowners and so they cannot take advantage of equity release in their retirement. Also the life expectancy for SSA is 59 years. Most of these people lack the resources to access formal housing finance facilities. Formal housing finance products such as mortgage seem to be unavailable and can't be assessed by the low income and middle-income earners. Most low income and middle-income earners (up to 90%) use their personal funds, savings or sweat equity etc. to acquire homes in a long process called incremental housing where houses are built in stages spanning 5-15 years as and when they get access to funds (CAHF, 2012). A reasonable number of prospective homeowners even move into these houses in its incomplete state and add up to it until it's complete.

When asked about whether they have future plans for the low income and middle income earners, some financial institutions said they do whilst others were uncertain.

The proposed solution in literature is to use future pension benefits as secured mortgage or collateral to homeownership as stipulated in Section 103(2) of the National Pension Law, 2008 (Act 776). This is because most Ghanaians barely live to retirement age and the few who do, live barely 5 years after retirement before they pass on making the pension benefits almost irrelevant to the beneficiaries. It is therefore strongly recommended that pension benefits or future lump sum payment serve as either a deposit for a mortgage or mortgage itself with the property acquired serving as a collateral. The probable challenge with this however is that it reduces the amount left for investment by the fund managers. Therefore it is suggested rather that the pension benefits be used as a collateral to secure mortgages from financial institutions specialized in it to reduce the pressure on pension funds for other lucrative opportunities.

Also, pension funds could be used to construct more homes because of its long-term nature; i.e. pension mortgage financing does not only solve the issue of housing deficit but also a means of providing affordable homes to low and middle-income earners aside, eliminating the maturity mismatch between long-term needs for housing loans and short term supply of such facilities. This tends to reduce liquidity risks, lessening the mortgage rates providing more room for housing projects and home acquisition. Also, the real estate developers main target clients are the high-to-upper middle class mainly professionals, corporate employees or well-to-do individual self-employed and expatriates leaving no room for low and lower middle-income earners.

Chapter 5

Impacts of Financing Instruments at the Financial System Level

5.1 Introduction

The importance of the financial system in meeting urban housing and infrastructure finance cannot be over emphasized. However, how the financial system is organized to encourage housing and infrastructure development varies from one country to another (Chen and Deng, 2014). Housing finance systems can generally be organized as market based or otherwise. Market-based systems are usually integrated into the mainstream national financial system while non-market based institutions are in the form of self-funded entities which are not integrated into the mainstream financial system (Cheng and Deng, 2014; Chiquier and Lea, 2009). Market-based systems are common among countries that have well-functioning and developed financial systems. Countries with underdeveloped financial systems on the hand tend to be inclined to non-market based housing finance systems. It is important however to mention that even non-market based systems cannot be strictly said not to impact or to be impacted by the mainstream national financial system. Thus all housing finance systems are expected to impact the mainstream financial system though the impact will be higher for market-based systems.

Ghana's housing finance has traditionally been non-market based and this has been mainly because of a hitherto underdeveloped financial system (Tipple, Korboe, Wellis and Garrod, 1998; Arku, 2014). The national financial system however has evolved over time and is gradually becoming akin to what has been known as developed financial systems. This means that soon Ghana's housing finance market could become market based. Meanwhile, if this will occur it will occur alongside rapid urbanizing nation. With urbanization comes the need for important urban infrastructure and municipal services. Municipal services include water, energy and sanitation. These services have also been traditionally financed by a non-market system. The nature of these infrastructure and services do not avail them to a market financial system.

Unlike housing which is largely considered to be private, urban infrastructure and municipal services are public goods and so they have traditionally been funded with public funds, grants and concessionary loans from foreign donors. However, with the promotion of Ghana to a lower-middle income status, there has been a cut in the number of available grants. It is therefore necessary to explore varied options of financing these infrastructure and services as these services will for the time being remain the responsibility of the state and local governments. We explore in this chapter what alternatives exist for financing these infrastructures, including housing, and municipal services and how market-based systems, if considered, will impact on the mainstream financial system (Sidawi, 2014). The discussion in this chapter is interlaced with the views expressed by the public in Accra and Tema to provide insight into how they will respond to these alternative financing instruments. These views were obtained through a two-city survey of residents.

Understanding the perception of the public and their willingness to support infrastructure financing mechanisms is important because in recent years, citizen participation in financial instruments has been proposed as a possible means of funding infrastructure. For instance Yildiz (2014) makes a case for why citizen participation is important in financing the renewable energy sector of Germany arguing that public authorities lack the needed funding while institutional private investors are averse to factors such as transaction cost and risk-return concerns. The situation is not different in Ghana where it is obvious to many that infrastructure financing is a challenge as the nation faces significant deficits in its infrastructure financing (Bank of Ghana, 2007). The next section explains the data collection processes and the sections that follow discuss and analyze the issues highlighted earlier while presenting the most important survey findings.

5.2 Methodology

The objective of the study was to systematically evaluate how financing instruments for housing and urban infrastructure and municipal services impact the financial system of Ghana. The survey methodology was employed for public opinions regarding alternative sources of funding and the role of financing instruments in financing urban infrastructure and municipal services. The data collection instrument was structured questionnaires (Al-Homoud, Al-Oun and Al-Hindawi, 2009). This method is common in the housing and urban services literature (e.g. Tipple, et al, 1998; Nyasula and Cloete, 2007; Al-Homoud, et al, 2009; Sidawi, 2014; Hutchinson et al, 2016). The questionnaire was structured into six sections. Similar to Al-Homoud, et al (2009), the sections included 65 questions that were meant to know the existing status and those that can be considered to by hypothetical. The essence of "what if" or hypothetical type questions was to elicit responses that would be indicative of how the public will respond to financing instruments if these are actively used in financing urban housing and municipal infrastructure and services. Such responses are useful for designing programs and projects. 200 self-questionnaires were sent out to respondents in Accra and Tema, two cities in the greater Accra region and the most urbanized of the regions in Ghana.

The questionnaires were meant to be completed by the respondents. The sample selection was based on residential status; that is, the respondent had to be resident in Accra or Tema. This distinction was important because there are people who live outside the region but work in the region. That population can be significant thus the need to consciously exclude them.

Residents with varied backgrounds were included to provide diversity in the responses on certain issues. Respondents were not specifically required to be active users or participants of financing instruments and

were allowed up to three days to complete the questionnaires to prevent a situation where people would hurriedly complete questionnaires without carefully considering the questions being presented. This means the responses obtained are reliable for the purposes here. The survey instrument was administered to the respondents at various locations including homes and offices. Since the instrument was self-administered, only those who were literate in the English language were included in the sample. That segment was 79.6 per cent of the population as at 2013 according to official estimates from the Ghana Living Standards Survey, Round Six (GLSS6, 2014). That means that the sample was taken from a representative segment of the region's residents. The results are presented in this chapter. A total of 131 questionnaires were returned.

5.3 Profile of Respondents

Ghana's population has generally been considered to be youthful (GLSS6, 2014). This was evident in our sample selection (see Figure 5.1). The ages of the residents who were included in the sample consisted of 20-29 (64.8 per cent), 30-39 (26.9 per cent), 40-49 (4.6 per cent), 50-59 (2.8 per cent) and older than 60 (0.9 per cent). 57.3 per cent of these residents were males while 42.7 per cent were female (Figure 5.2). A quarter was married while about seven in ten people were not married or were divorced (see Figure 5.3). Figure 5.4 shows that 85.5 per cent had university education while the remainder had lower levels of education or had no schooling at all. We show in figure 5.5 that 64.8 per cent of residents reported that they were permanent employees while 23.1 per cent were in part-time or contract employment and 6.5 per cent were not employed. The remaining 5.6 per cent were either self-employed entrepreneurs or were combining private business and a job in another firm.
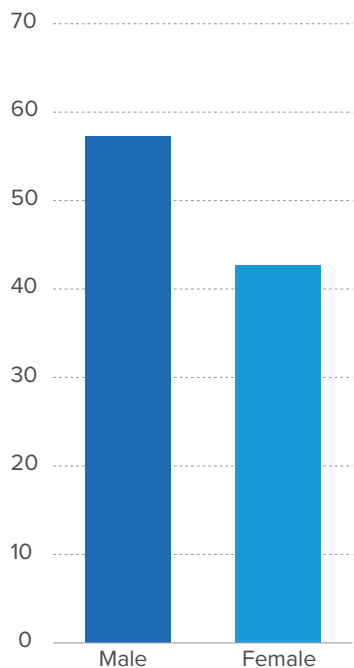
Figure 5.1 Ages of Respondents

4% 3% 1%

27%

65%

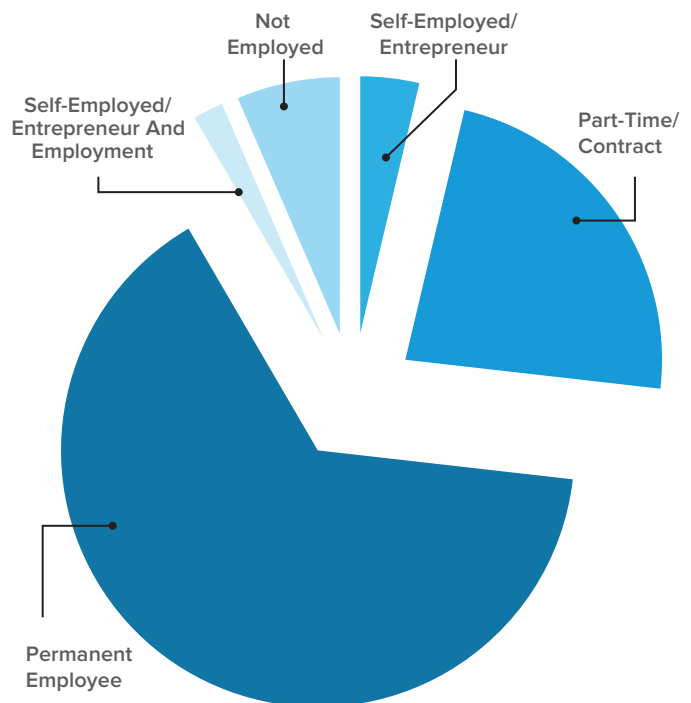■20-29 ■30-39 ■40-49 ■50-59 ■60+
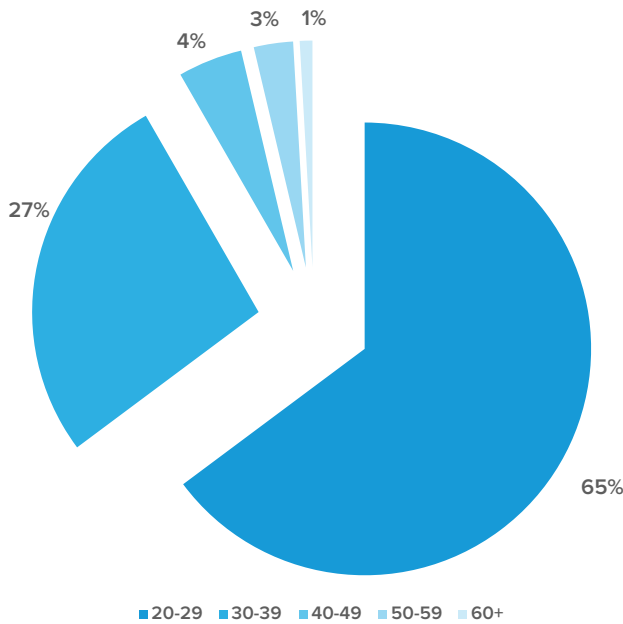
Source: Survey Data, 2016

A majority of the residents interviewed were employed in the services sector (71.3 per cent) while the remainder worked in other sectors of the economy such as Trade (7.4 per cent) construction (8.5 per cent), Agriculture (2.1 per cent), Manufacturing/construction and others (10.6 per cent). This is illustrated in Figure 5.6. The monthly income of 20.6 per cent of the residents was above GHC2000 ($500) while 1 per cent had monthly incomes below GHC150 ($37.5). Three out of ten people have monthly income between GHC500 ($125) and GHC1000 ($250) and four in ten earned between GHC1000 ($250) and GHC2000 ($500). 12.7 per cent had incomes between GHC150 ($37.5) and GHC500 ($125). Information on their income levels are shown in Figure 5.7.
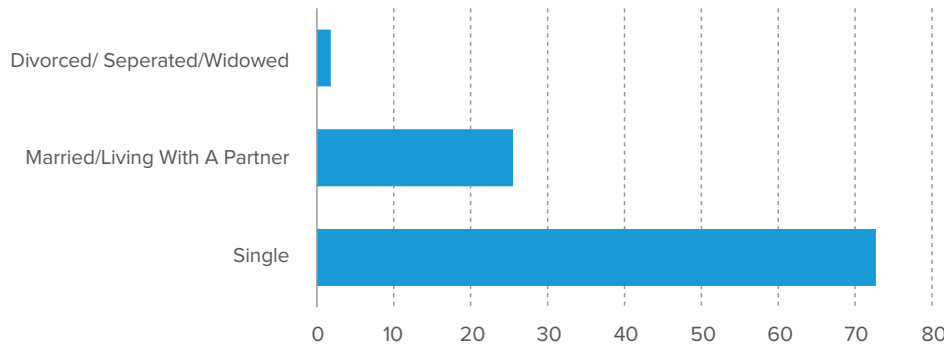
Figure 5.2 Gender of Respondent

Source: Survey Data, 2016
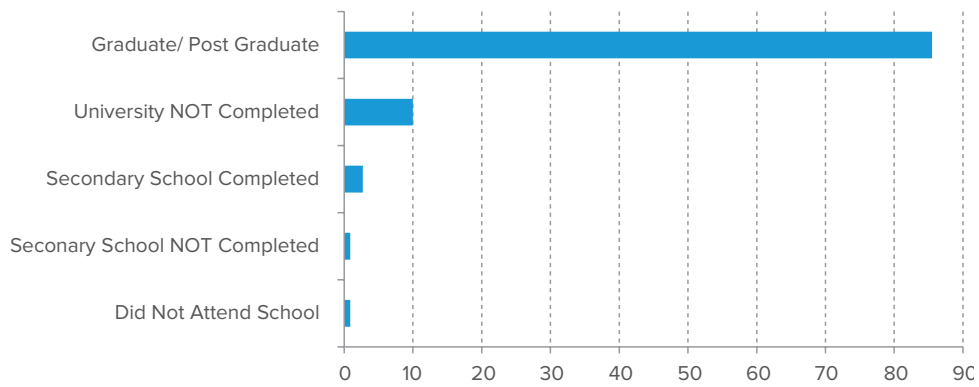
Figure 5.3 Employment Status (%)

Not Employed

Self-Employed/ Entrepreneur

Self-Employed/ Entrepreneur And Employment

Part-Time/ Contract

Permanent Employee

Source: Survey Data, 2016

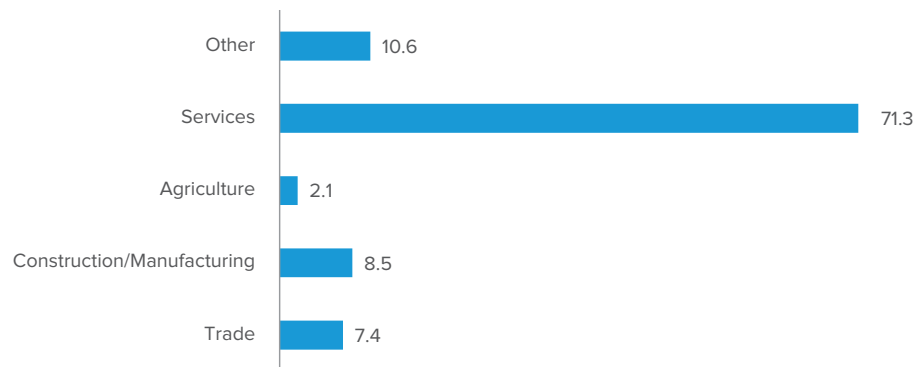**Figure 5.4** Marital Status (%)

Source: Survey Data, 2016

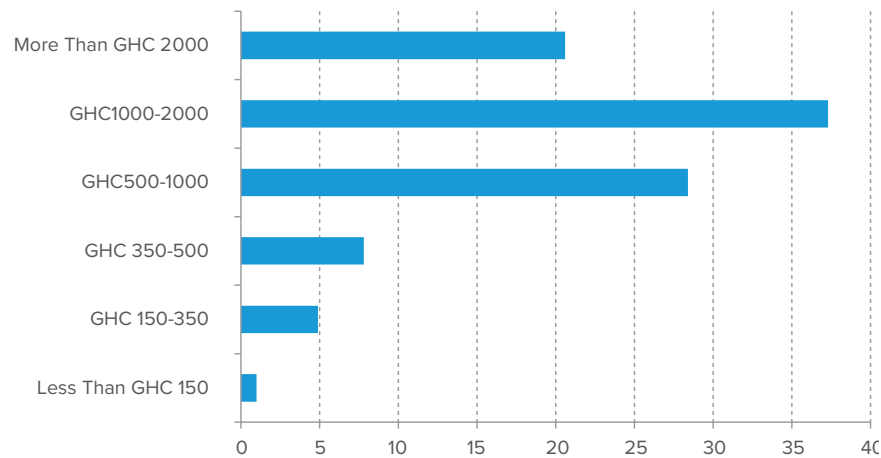**Figure 5.5** Level of Education (%)

Source: Survey Data, 2016

Figure 5.6 Sector of Employment (%)

Source: Survey Data, 2016

Figure 5.7 Monthly incomes of Residents (%)

Source: Survey Data, 2016

5.4 Discussion of Findings

5.4.1 Status of Housing Finance in Accra and Tema

Ghana's housing sector has seen significant fundamental changes in the last two decades (Arku, 2009). This has largely involved a shift from state provision to private provision (Konadu-Agyemang, 2001). Accordingly, housing finance has moved strongly over the period to the current state where it is dominated by the private sector (Arku, 2009). Ghana's financial markets can be considered to be underdeveloped as is the case with many other developing countries (Nyasulu and Cloete, 2007). Financing instruments in the form that they exist elsewhere are not in wide use in Ghana. This has been established in chapter two. That means that before assessing how financial instruments will impact upon the financial system and even if they will be useful in meeting their objectives, it is important to understand the state of housing finance in the two cities (Konadu-Agyeman, 2001; Arku, 2009). Knowing what has existed in the past is an important part of the process of preparing a better future.

5.4.1.1 Rental Units
It has been established earlier in chapter two that rental housing is common among the low and lower-middle income segments

of the society. For the residents sampled for this chapter, we find that 26.5 per cent of the residents paid a monthly rent that was less than GHC150. Single rooms generally cost between GHC40 and GHC250 to rent in the two cities. 31.6 per cent paid rent of between GHC150 and GHC250 while 20.4 per cent pay between GH250 and GHC350 (see Figure 5.8). It is clear therefore that a majority of residents who live in rental units in the two cities live in single room or at best in one bedroom housing units (see chapter two). 20.4 per cent paid rent between GHC350 and GHC500 (11.2 per cent) and more than GHC500 (10.2 per cent). We noted that high quality one bedroom rental units and some two bedroom units cost between GHC250 and GHC500. These generally will be at most about a quarter of incomes that were reported (see Figure 5.7). Compared to findings by Tipple et al (1998) and Konadu-Agyemang (2001), our findings show that the rental cost in the greater Accra has increased significantly over the last two decades.
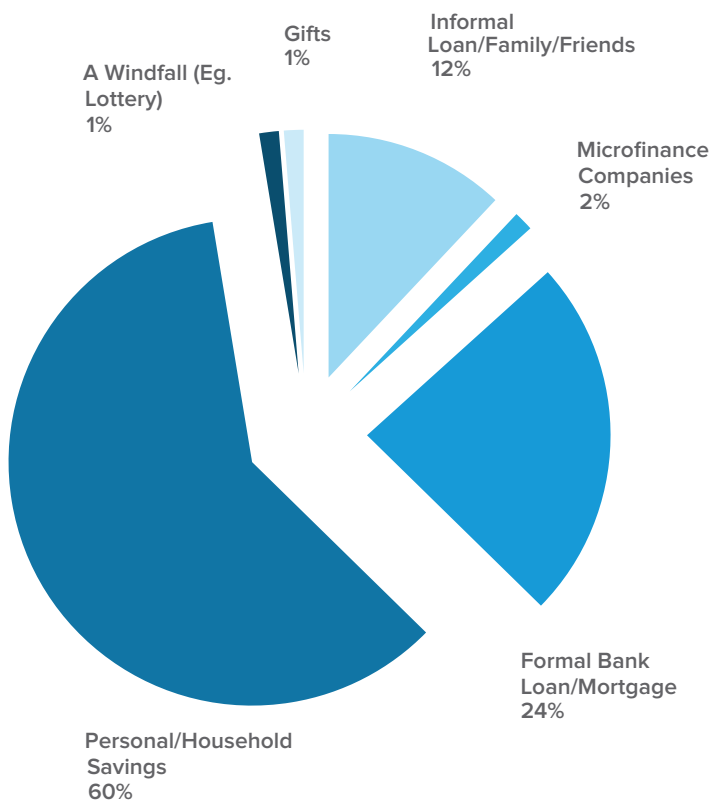
5.4.1.2 Owner Occupied Units
For people who live in their own houses, the major source of income was from personal or household savings. Savings constituted 60 per cent of the housing finance in the two cities. This is similar to finding by Barakat and Tuffaha (1995), Al-Omari (2003) and Al-Homoud (2009) who found in various countries that people usually tend to spend their life savings on home

acquisition (Donkor-Hyiaman and Owusu-Manu, 2016). The second most common source of financing for housing units was formal bank loans and mortgages. This source contributed 24 per cent of housing finance in the cities. 12 per cent used informal loans or loans from family and friends. A negligible portion (3.9 per cent) of homes was funded with micro loans and windfalls or gifts. These can be seen from figure 5.9.
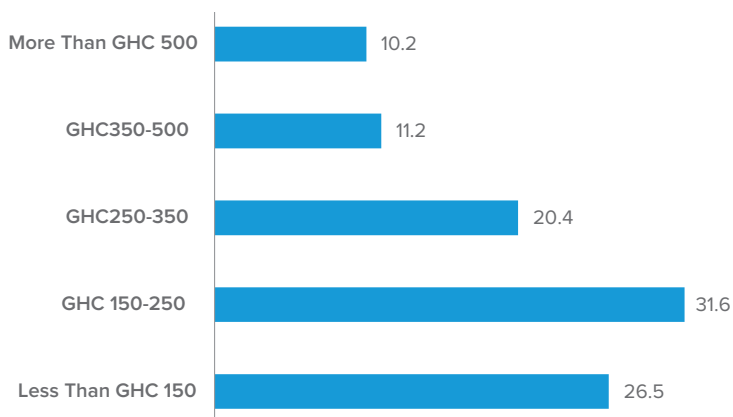
The cost of acquiring housing units varied. A majority of these homeowners spent more than GHC100,000 to acquire their current housing units. We found in chapter two that housing units generally sold for prices higher that GHC100,000. Just about how much they cost two decades and a decade ago as was documented by Tipple et al (1998) and the Bank of Ghana (2007) in terms of the Pound Sterling and US Dollars. However these houses are increasingly moving out of reach of cedi earners due to the depreciation of the currency. 29.5 per cent spent between GHC50000 and GHC100000 and 27.9 per cent spent between GHC100001 and GHC200000. The rest spent between GHC200001 and GHC30000 (14.8 per cent) and 18 per cent spent more than GHC 300000. 9.8 per cent however spent less than GHC50000 on acquiring their house (Figure 5.10). The length of time in owning houses varied amongst respondents. One in five homeowners was a new house owner who had owned their dwelling for less than a year. A quarter of homeowners had however owned their dwelling for more than a decade. The largest category was for durations between 1 to 5 years which constituted 31.8 per cent of the sample (Figure 5.11)

Figure 5.8 Major Sources of Funding for Building or Buying (%)

Gifts 1%
Informal Loan/Family/Friends 12%
A Windfall (Eg. Lottery) 1%
Microfinance Companies 2%
Formal Bank Loan/Mortgage 24%
Personal/Household Savings 60%

Source: Survey Data, 2016

Figure 5.9 monthly Rent (%)

|	
More Than GHC 500	10.2
GHC350-500	11.2
GHC250-350	20.4
GHC 150-250	31.6
Less Than GHC 150	26.5

Source: Survey Data, 2016

5.4.2 Status of Financial Instruments in Financing Housing, Urban Infrastructure and Municipal Services

Overall, it is the case that financing instruments are not popular among Ghanaian home owners and prospective homeowners. But for the few who had used financial instruments, the main instrument was loans. The two major groups of persons who owned houses took loan amounts of either less than GHC 50,000 or amounts between GHC 50,000 and GHC100,000. These two groups accounted for 35.9 per cent each of the sample. These put together constitute 71.8 per cent which implies that for a

great number of homeowners who used debt financing for their home acquisition, their loan sum was up to GHC100,000 as is shown in figure 5.12. The second majority of people used loans to acquire houses, their loan principal range from GHC 100,001 to GHC200,000. This constitutes 20.5 per cent of the number of homeowners who had used this instrument. Another category of homeowners who used debt financing, had loan sums ranging between GHC200,001 and GHC300,000 (5.1 per cent of homeowners who use loans or debt). The smallest category is those who used loans had loan sums exceeding GHC 300,001 to acquire their houses. These are shown in figure 5.12.

Figure 5.10 Cost of Building or Buying (%)
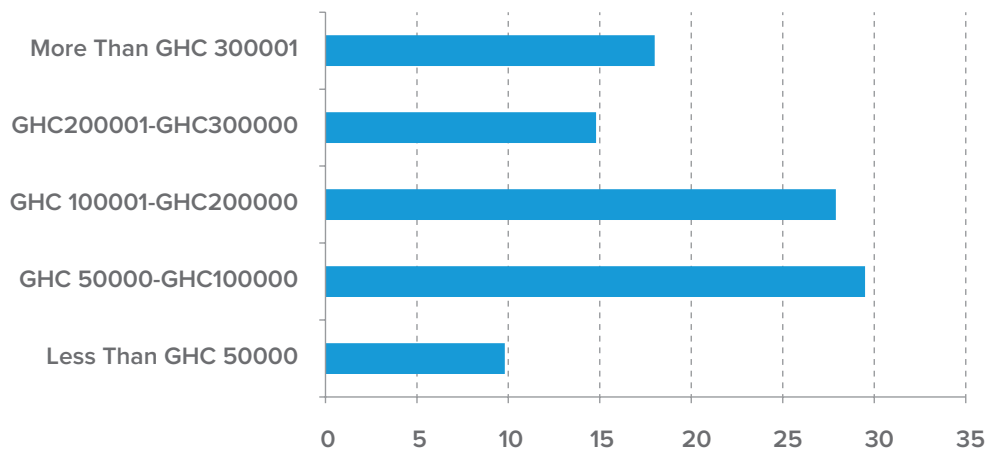
Source: Survey Data, 2016

Varied reasons were given for the choice of loan or mortgage as a financing instrument for home acquisition. A large number of people indicated that it would have taken longer to acquire the amount needed for the house. The percentage of people that gave this as a reason was 46.2 and 35.9 per cent chose to use debt financing because they did not have ready cash to acquire the unit and had
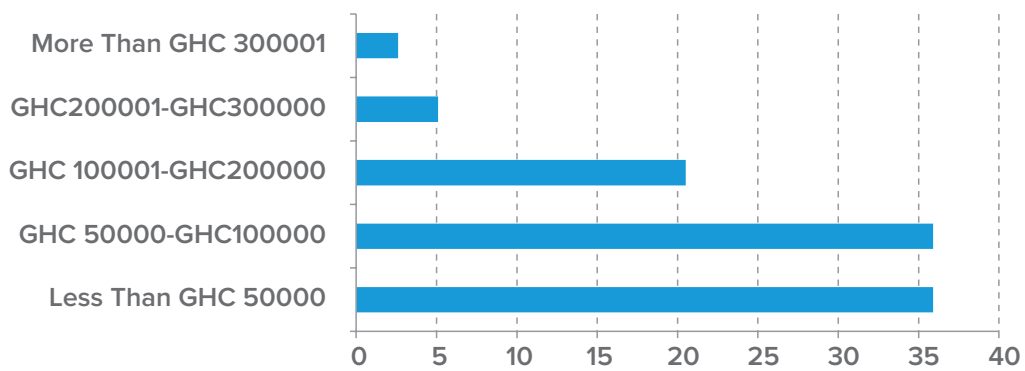
to rely on a loan or mortgage. For 12.8 per cent of homeowners who had used financial instruments, their motivation was that the savings interest rate was too low and that this made savings unattractive to them (Donkor-Hyiaman and Owusu-Manu, 2016). A small number of homeowners (5.1 per cent) chose loans as a means of risk sharing (see Figure 5.13; Tiwari and Moriizumi, 2003).
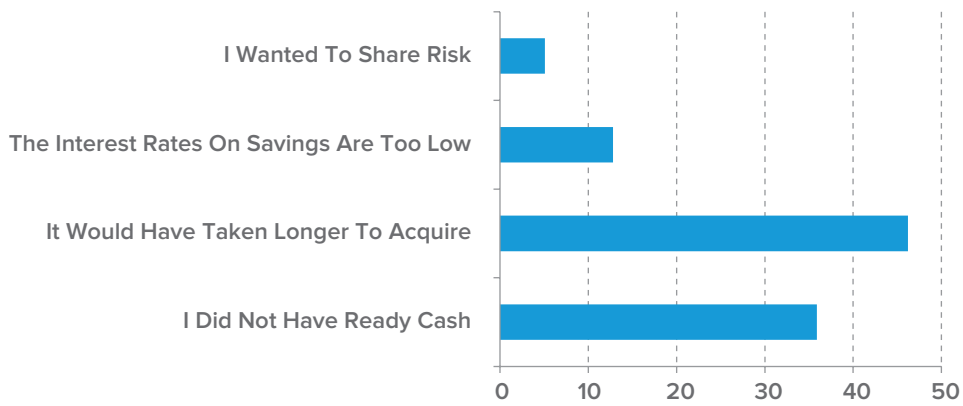
Figure 5.11 Period of Owning a House (%)

Period	Value
More Than 10 Years	25.8
6-10 Years	22.7
1-5 Years	
Less Than A Year	19.7

Source: Survey Data, 2016

Figure 5.12 Loan Amount for House

Category
More Than GHC 300001
GHC200001-GHC300000
GHC 100001-GHC200000
GHC 50000-GHC100000
Less Than GHC 50000

Source: Survey Data, 2016

Figure 5.13 Reason for Loan/Mortgage (%)

| Reason |
|--------|
| I Wanted To Share Risk |
| The Interest Rates On Savings Are Too Low |
| It Would Have Taken Longer To Acquire |
| I Did Not Have Ready Cash |

Source: Survey Data, 2016

These reasons appear to suggest that people who had used debt financing were sufficiently informed about the alternatives available to them as well as the advantages of u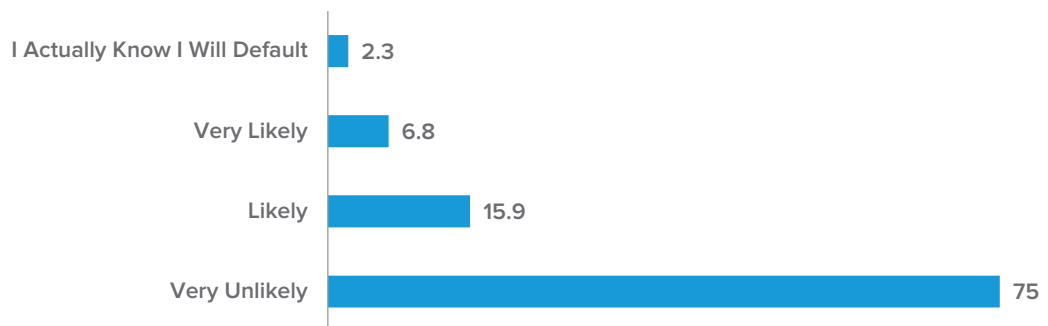sing debt finances. It is instructive therefore to note that the level of financial literacy can be argued to be correlated with the usage of financing instruments for home acquisition. This is validated by the literacy level identified in figure 5.4.

Figure 5.14 Ease in Repaying Loan/Mortgage (%)

- Very Easy
- Somewhat Easy
- Indifferent
- Difficult
- Somewhat Difficult
- Very Difficult
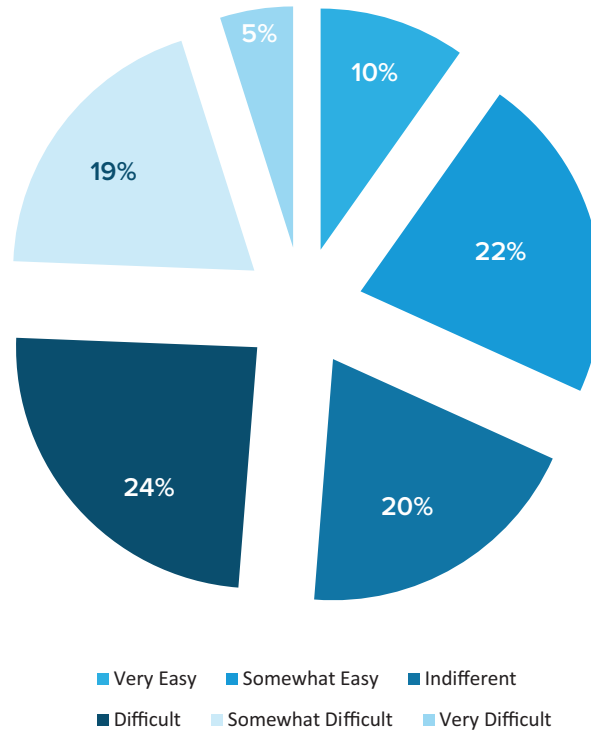
Source: Survey Data, 2016

Figure 5.15 Likelihood of Default (%)

Source: Survey Data, 2016

5.4.2.1 Risks

The use of financial instruments is inevitably expected to be associated with some risks. One important risk is the likelihood of default (Tiwari and Moriizumi, 2003). Respondents were asked to state how easy they found the repayment of their debt instrument. A greater percentage of people sampled said they found it difficult repaying their loans/mortgages (Konadu-Agyemang, 2001). This was about a quarter of the users of debt instruments. 22 per cent of them said they found it somewhat easy in the repayments whereas 19.5 per cent were indifferent. This is shown in figure 5.14. The remainder indicated that they found repayment somewhat difficult. These findings resonate with earlier findings by Konadu-Agyemang (2001) who found that the repayment of mortgages has perpetually been difficult for the typical Ghanaian middle income earner. More than fifteen years down the line this risk factor still lingers on in the Ghana housing finance sector (Donkor-Hyiaman and Owusu-Manu, 2016). Notwithstanding the difficulty expressed in repayment, three quarters of these homeowners said they were very unlikely to default. Thus though they feel stressed in the repayment of their loans, they were certain to be regular in repayments. This is probably a due to the fact that loan repayments in Ghana for many is by a standing order on their account or a deduction from their incomes at source. 15.9 per cent stated that they are likely to default whilst 6.8 per cent said they were very likely not to meet the repayment of the loan/mortgage. The last category of people (2.8 per cent) indicated frankly that they know that they would default in their repayments (see Figure 5.15; McCord, et al, 2016).

Another important risk factor is the risk of diversion (Tiwari and Moriizumi, 2003). We find that 34.3 per cent of the residents did not use the entire sum of the loan for home acquisition. This is shown in figure 5.22. It can be concluded thus that there is the likelihood that people would take loans under the pretext of using it to acquire housing units only to use them for other purposes. Financial institutions must therefore ensure that facilities offered are used for the stated purposes. If customers purchase homes that are worth much less than the loan, financial institutions would be overstating the value of their collaterals, something which is risky for their liquidity position (Nyasulu and Cloete, 2007).

5.4.2.2 Cost of Financing Instruments

Cost is an important factor in assessing financial instruments. 69.4 per cent borrowed in Ghana Cedis but 30.6 per cent borrowed in United States Dollars (Figure 5.19). 58.3 per cent of homeowners who had used debt financing indicated that the rate of interest they paid or were still paying were not affordable to them. As shown in figure 5.16 the remaining 41.7 per cent found the rate they were paying or had paid to be affordable. 54.5 per cent of these people paid a fixed rate over the term of their loan while 45.5 per cent paid variable rates (see Figure 5.20; Gulter and Basti, 2014).

Figure 5.16 Do you find the rate affordable (%)

No
58%

Yes
42%
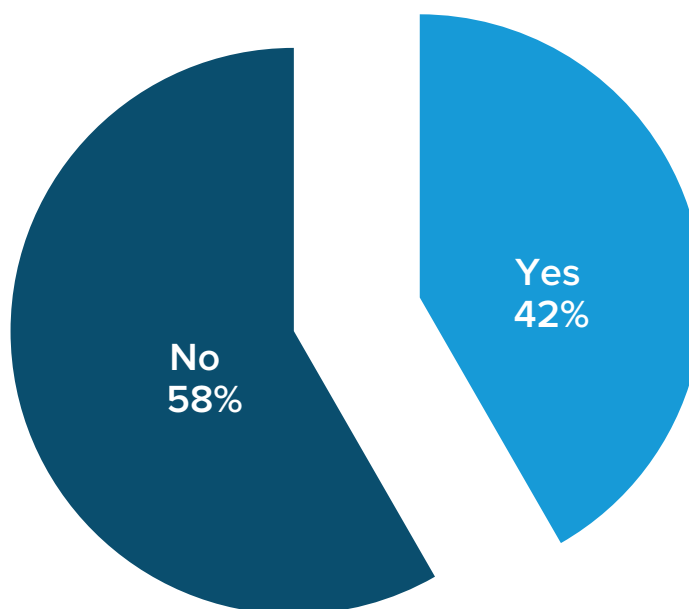
Source: Survey Data, 2016

Although a greater number of people specified that the interest rates on loans were high, they went ahead to secure these loans because a large number of them indicated that taking loans was the only option available to them and this constituted 70.8 per cent. Some people wanted to own houses at all cost so they settled for these loans and the percentage of such group was 20.8 per cent. 8.3 per cent mentioned that they had other reasons than the two options provided (Figure 5.17). Loans were generally considered to be stable by a total of 60 per cent. From figure 5.18 40 per cent of the home owners however thought interest rate had generally been unstable in recent past.

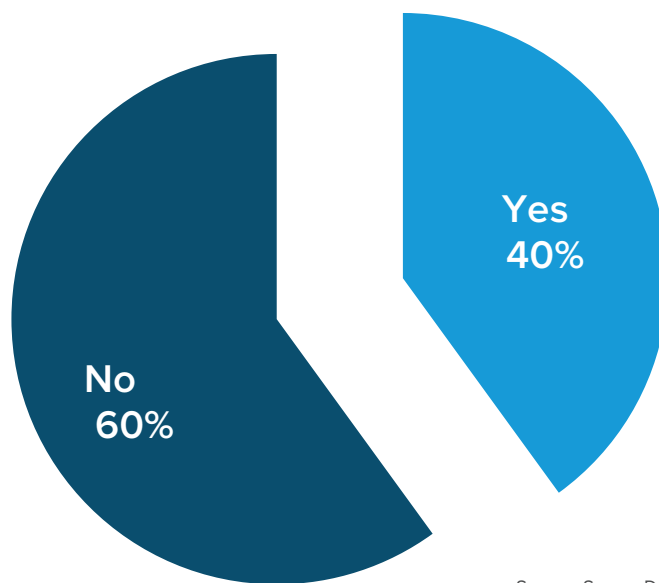**Figure 5.17** **Reason Taking loan with a higher rate (%)**
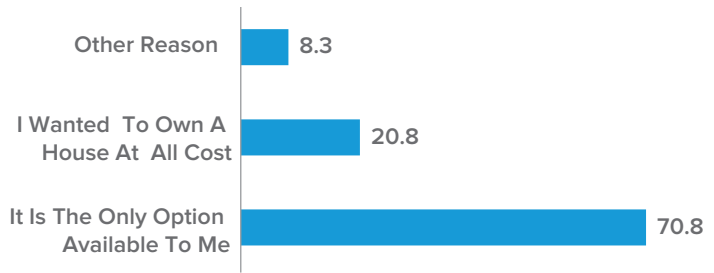
Source: Survey Data, 2016
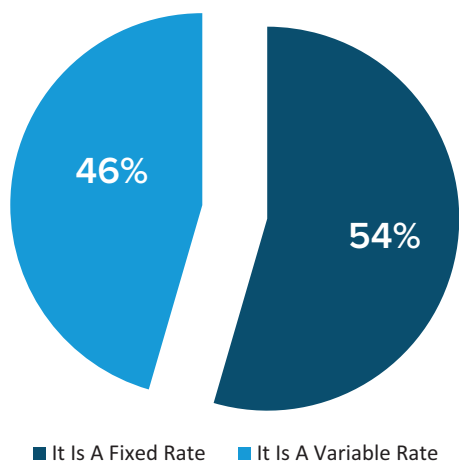
Figure 5.18 **Currency of Borrowing**
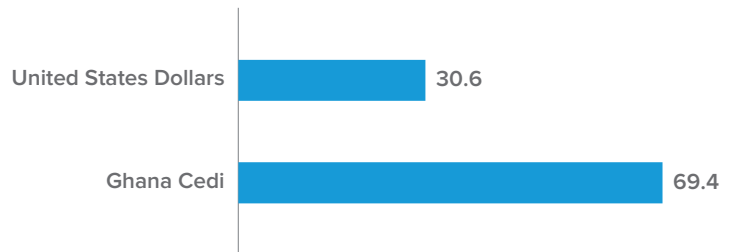
Source: Survey Data, 2016

Figure 5.19 **Has there been Stability in the interest rate in recent years (%)**

Source: Survey Data, 2016

Figure 5.17 Reason Taking loan with a higher rate (%)

■ It Is A Fixed Rate ■ It Is A Variable Rate

Source: Survey Data, 2016

Figure 5.17 Reason Taking loan with a higher rate (%)
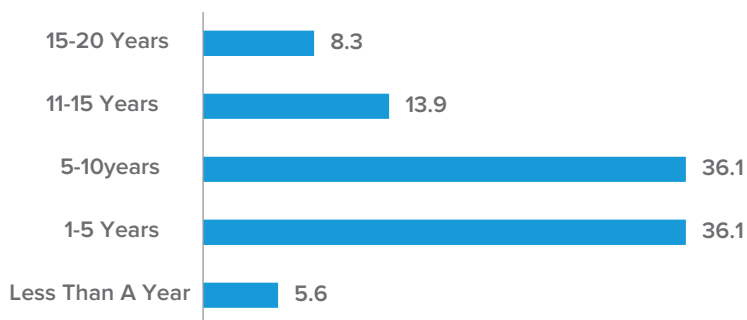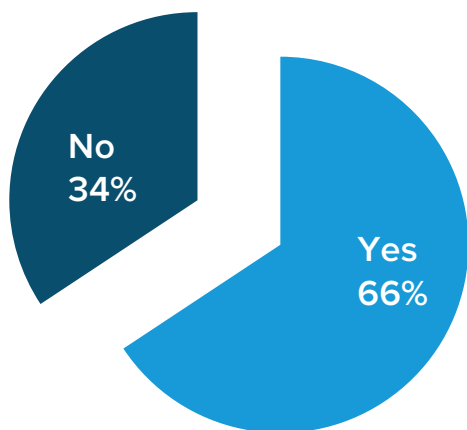

Figure 5.17 Reason Taking loan with a higher rate (%)


5.4.2.3 Term of Instruments

The term of loans varied among users of this instrument. These mainly ranged from one year to 10 years. These are shown in figure 5.21. From Figure 5.21, it can be seen that 36.1 per cent of users had their loan/mortgage tenure being between 1 to 5 years and the other 36.1 per cent from 5 to 10 years (Komurlu, 2006; Hepson, 2010). The rest had their loan/mortgage term being between 11 to 15 years and they constituted a percentage of 13.9. Those that had their loan/mortgage lasting from 15 to 20 years summed up to 8.3 per cent. 5.6 per cent had their loan/mortgage lasting for less than 1 year (Konadu-Agyemang, 2001; Elliot, 2010).

5.4.3 Savings

We have established previously that most people use savings to finance their home purchases. The savings mechanism is common among developing countries (Chen and Deng, 2014). The dominant motivation for using this option among the public was that they were not sure if they could repay a loan if they took one. This was the reason among 39.5 per cent of home owners who had used savings to finance their home acquisition. 28.9 per cent each indicated that there was high interest on loans or on savings for which reason they were motivated to save to finance their houses (Donkor-Hyiaman and Owusu-Manu, 2016). 2.6 per cent stated that they had other reasons besides these. This finding is similar to Al-Homoud, et al (2009) who found that the cost of loans was a factor that adversely affected the Jordanian housing finance sector.

Figure 5.23 Motivation for saving for a house (%)
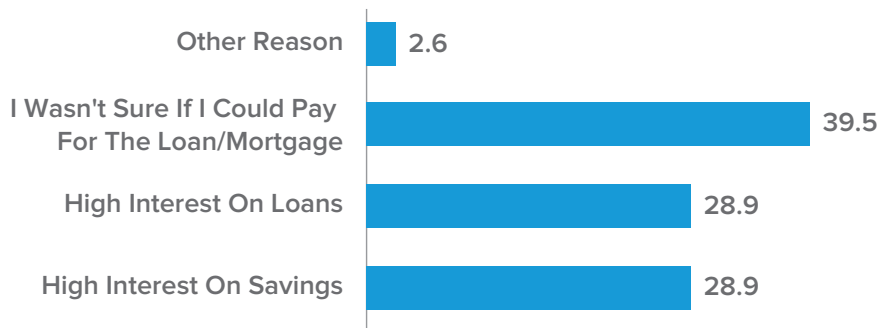
Source: Survey Data, 2016

5.4.4 Risk Management

Risk management is an important feature of a resilient financial system (Tiwari and Moriizumi, 2003). An important risk management tool is insurance. In the Ghana mortgage market, respondents 69.8 per cent indicated that they had protected their mortgages with an insurance facility (Figure 5.24). However, a larger percentage (64.1) of these people stated that they had no insurance for their houses (Figure 5.25).

Figure 5.24 Insurance for Mortgage/Loan (%)
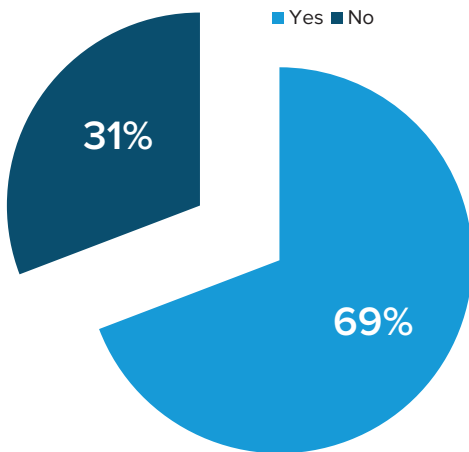
Source: Survey Data, 2016

Figure 5.25 Insurance for House
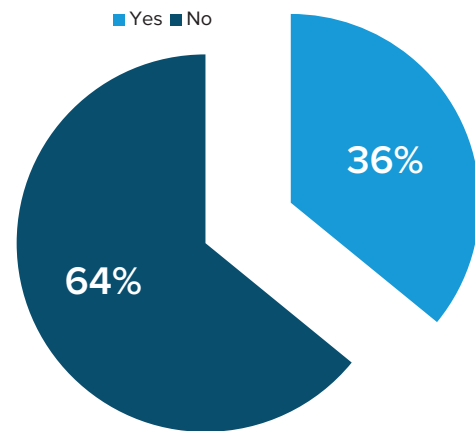
Source: Survey Data, 2016

5.4.5 Taxes

56.1 per cent of homeowners sampled indicated that they pay taxes on their houses whilst 43.9 per cent did not (Figure 5.27). Taxes paid annually on homes was between GHC250 and GHC500 (for 28.5 per cent of those who pay taxes) and between GHC500 and GHC1000 (for 21.4 per cent of those who pay taxes). From figure 5.28, it is shown also that 35.7 per cent pay taxes below GHC250 while 14.2 per cent paid taxes above GHC1000.

Figure 5.26 Annual Expenditure On Insurance (%)

More than GHC1000	18.2
GHC500-1000	18.2
GHC301-500	18.2
GHC201-300	9.1
GHC100-200	9.1
Less than GHC100	27.3
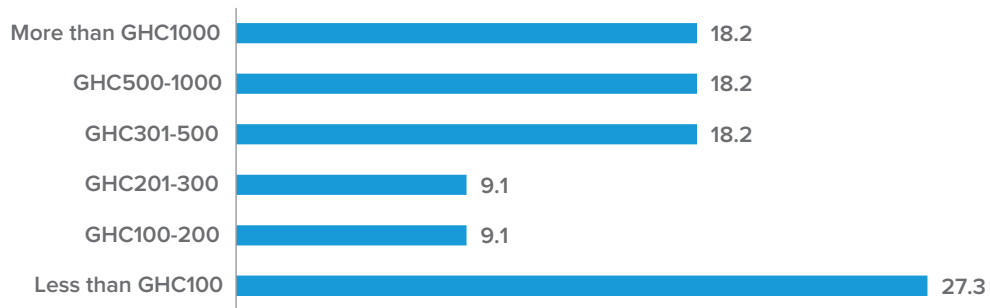
Source: Survey Data, 2016

Figure 5.27 Do you pay Taxes on your House? (%)

No	43.9
Yes	56.1

Source: Survey Data, 2016

5.4.6 Reception of Financing Instruments for Financing Affordable Housing and Urban Infrastructure and Municipal Services

Understanding how the public will receive the introduction of financing instruments to finance urban infrastructure and services is an important part of the process of evaluating how these instruments will impact the financial system (Yildiz, 2014). We now discuss the views of the respondents on how they regard the use of financial instruments to finance social and economic infrastructure in the two cities.

Figure 5.28 Annual Tax Payment (%)

More than 1000	14.2
GHC500-GHC1000	21.4
GHC250-500	28.5
Less than GHC250	35.7
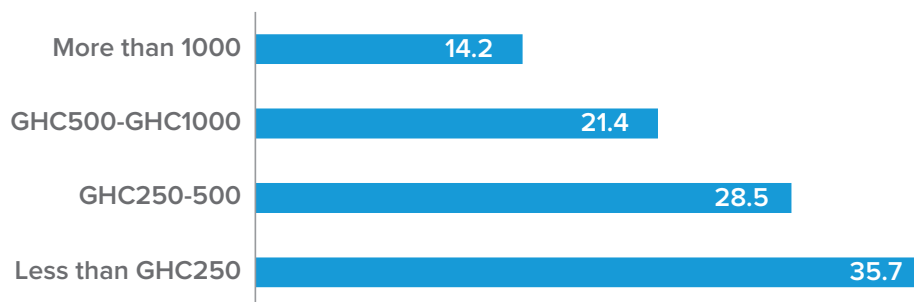
Source: Survey Data, 2016

5.4.6.1 Affordable Housing financing

We show here the reception of residents of the two cities towards various financing instruments which can be considered for financing affordable housing projects. A majority of people, constituting 76.1 per cent of the sample suggested that the government should use various finance instruments to finance affordable housing projects while 9.2 per cent did not agree with the government raising financing instrument for affordable housing projects. This shows an impressive level of reception for the need to use alternative instruments for financing urban housing infrastructure. The rest were indifferent as to whether the government should use financial instruments. These responses are illustrated in figure 5.29. There exists a variety instrument available to the government for financing affordable housing. Residents were enquired of which of these they believe were appropriate for the government to use. Four in every ten respondents selected taxes as a tool for financing affordable housing while about a quarter opted for equity finance (Tiwari and Moriizumi, 2003). Not surprisingly, 57.5 per cent were unwilling to pay taxes to be used for financing affordable housing projects (Figure 5.31).

Figure 5.29 Should The Government Use Financial Instruments To Finance Affordable Housing Projects? (%)
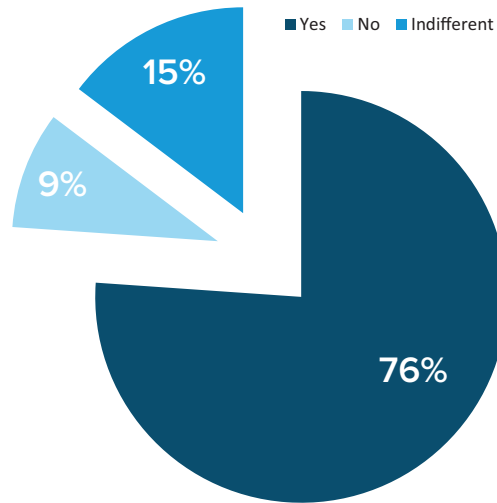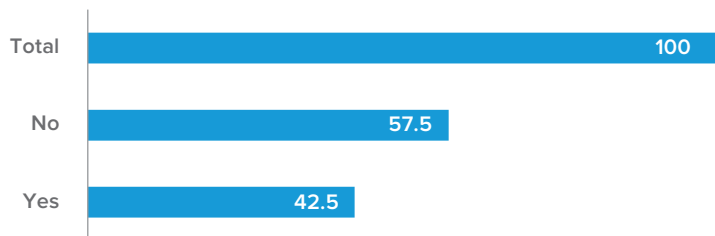

Source: Survey Data, 2016

Figure 5.30 Instruments Available For Financing Affordable Housing Projects (%
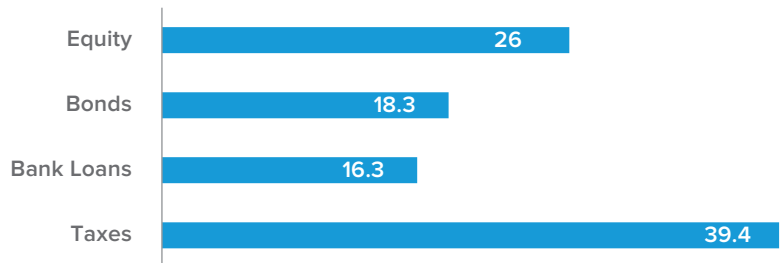
Source: Survey Data, 2016

Figure 5.31 Willing To Pay Tax If It Is To Be Used For Affordable Housing (%)
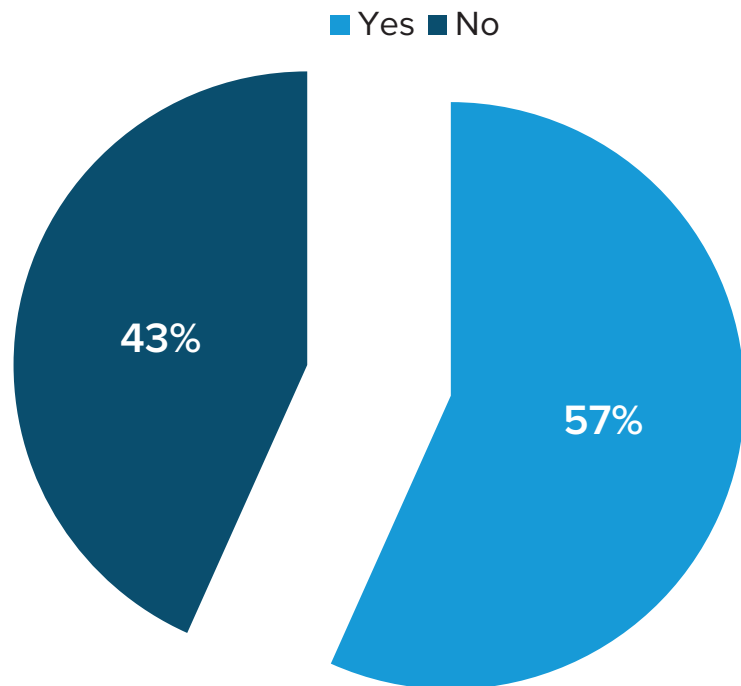

Source: Survey Data, 2016

Equity financing comes in different forms. One form is for the government to establish a state housing entity which will provide housing for residents of the two cities (Arku, 2009). This entity will provide affordable housing in the form of both rental units and for outright purchase or mortgaging. This will make the state an active player in the housing industry with equity stake in a housing entity. The second form of state equity financing is for the government to pay part of the cost of acquisition of housing units for its residents. This can be in a 50-50 proportion or 70-30 proportion (Zhou, 2014). Government then tends to hold a stake (equity) in the housing units as a co-owner with its occupants. Zhou (2014) argues that this approach eases the burden of cost of acquisition on the homeowners. Under this arrangement the co-owners cannot sell the housing unit later except to the government at an agreed fair market price, allowing the government to enjoy value appreciation. These homes if purchased back by government can be reallocated to another household on similar terms. The advantage of this option is that it prevents people from acquiring "affordable" housing units only to resell. State involvement in the housing sector is not new in Ghana.

For example Tipple et al (1998) and Konadu-Agyemang (2001) documented that the state has been actively involved in home financing for several decades. This has however not been sustainable and for some time now it is clear that the private sector is the most important in the housing sector. For instance Arku (2009) notes that the government of Ghana now primarily plays a supportive role in housing finance but channels its funding into urban service and infrastructure. Also, housing entities which were formally state-owned like Tema Development Corporation (TDC) and State Housing Corporation (SHC) are currently required to obtain private capital and function as commercial entities (Karley, 2008; Arku, 2009).

That notwithstanding, the National Housing Policy (2014) and recent announcements signal government's intention to get involved again in the housing finance. For instance, government announced that it has completed over 10,000 housing units in the Greater Accra Region as at 2016 which it will soon make available for purchase to the public. Zhou (2014) reported that the equity financing strategy has been successfully implemented in china and could be successful in Ghana if implemented properly.

Figure 5.32 Would You Participate In Bond Issue By Government For Affordable Housing Projects? (%)

Source: Survey Data, 2016

On how to fund housing for the middle income and low income groups of the two cities some 18.3 per cent of the respondents indicated that bonds can be issued to finance affordable housing projects while 16.3 per cent believed bank loans are a good instrument for financing these projects. The results are displayed in Figure 5.29. Bonds are not new in its usage to finance affordable housing projects (Hutchison, et al, 2016). Al-Homoud, et al, (2009) documented that these were in

active use in Jordan. In that country this was dominated by banks who issued bonds in order to raise funds for lending to the housing sector. 56.7 per cent of the respondents indicated that they were willing to partake in bond issue if the government did so to finance affordable housing projects. Meanwhile the other 43.3 per cent would not want to participate in bond issued for that purpose (see Figure 5.31). These results clearly show that the public will support debt financing instruments for financing affordable housing projects but not taxes meant for that purpose. This is understandable giving that the Ghanaian real estate industry is among the growing and flourishing sectors of the economy and many residents of the two cities long to own lands and buildings as a form of investments. They will therefore be willing to contribute to a venture in that industry if such contribution is presented as an investment.

Thus, there exists a potential for debt financing to be successful in the funding of these projects. Such instruments do not necessarily have to be issued by a state entity. Private sector players could use these instruments to finance the urban infrastructure and municipal service needs (Gbadegesin and Aluko, 2014). Arku (2009) argues that private sector involvement has some critical advantages and the role of government should be limited to creating a supportive regulatory, legal and economic environment that will make the private sector to thrive. While this argument has great merit, we have established earlier in chapter two that this will still not ameliorate the needs of the urban poor and a majority of middle income (Karley, 2008). There is therefore the need for the government to get involved to provide truly affordable housing units for some sections of the urban populace. If effectively done this would solve the urban housing challenge.
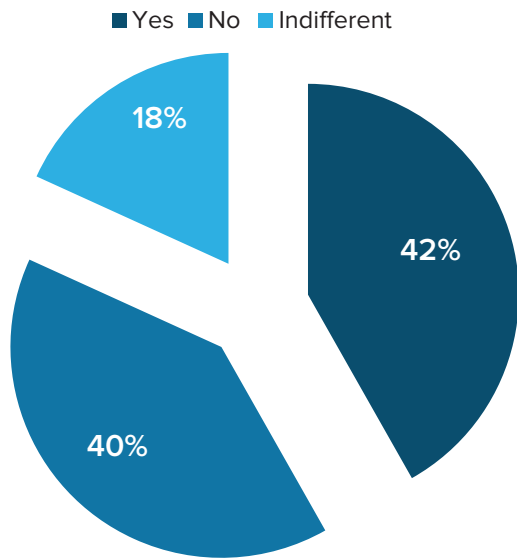
5.4.6.2 Energy and Transport Financing
We now show how receptive residents of the two cities are to the use of various forms of financing instruments for urban energy and transport. A majority of the public that were interviewed expressed the view that various financing instruments should be used in financing urban transport and energy (Yildiz,

2014; Ng and Tao, 2016). The results are shown in Figure 5.33. From Figure 5.33 it can be seen while 42 per cent responded that financial instruments should be used to finance the urban transport system, 40 per cent said this option should not be considered (Akindele and Iwisi, 2006). Meanwhile the remaining 18 per cent were indifferent on whether the option should be considered. Furthermore, 42 per cent of the public were of the view that taxes are the most appropriate source for funding the urban transport system (Bogataj, McDonnell and Bogataj, 2016). Bank loans were the least preferred. 23 per cent selected equity as a means of funding the urban transport system. The result is shown in figure 5.33. This method of financing comes in the form of an independent entity being contracted by government to fund road or other transport infrastructure in return for the right to collect user fees to repay the cost of construction over a period and to provide profit for the funding entity. This is effectively a Public Private Partnership (Al-Homoud, et al, 2009; Gbadegesin and Aluko, 2014) in the transport sector. 16 per cent of the public on the one hand were of the view that bonds will serve appropriately to finance the urban transport system.

A significantly higher proportion (62 per cent) of the public however indicated that they were willing to participate in bonds that were intended for financing urban transportation (Figure 5.35). Another 54 per cent expressed similar willingness to participate in bonds that were intended for use in financing urban energy infrastructure (Figure 5.36, Hutchison et al, 2016). Such participation has been strongly recommended by Yildiz (2014). These results represent a good opportunity to fund urban transport and energy infrastructure using debt financing or a combination of debt and equity financing (Deakin, 1999; Jenkins, Majano and Guiteirrez, 2016). Gulter and Basti (2014) suggested that private institutional players in the housing finance sector can issue security-backed mortgages to help solve housing challenges while giving investors a window long-term investment of opportunity.

Figure 5.33 Should Financing Instruments Be Used To Finance Urban Transport? (%)

■ Yes ■ No ■ Indifferent

Source: Survey Data, 2016

Figure 5.34 Most Appropriate Instrument For Financing Urban Transport (%)

■ Taxes ■ Bank Loans ■ Bonds ■ Equity ■ Other Debt
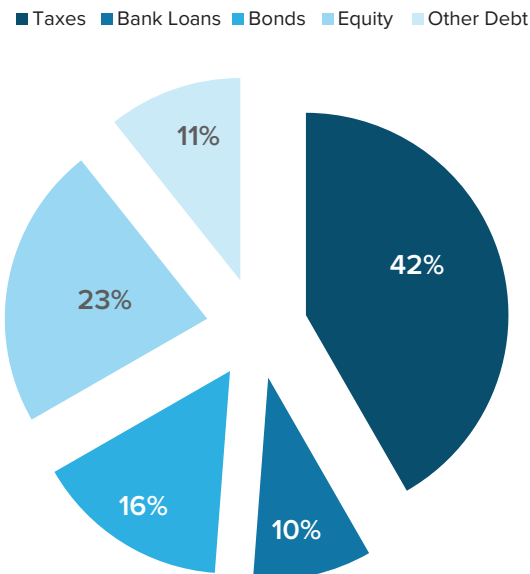
Source: Survey Data, 2016

Figure 5.35 Willing To Participate In Bond For Urban Roads And Transport Financing? (%)

■ Yes ■ No
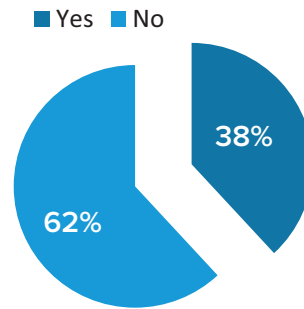
Source: Survey Data, 2016

Figure 5.36 Participation In A Bond Issue If Intend To Use It For Financing The Energy Sector

■ Yes ■ No
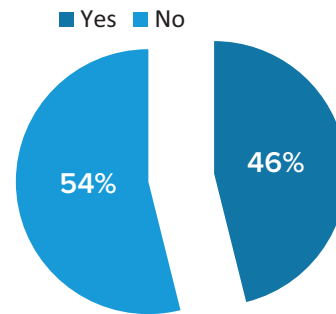
Source: Survey Data, 2016

Figure 5.37 Most Appropriate Option For The Water And Sanitation Sector

■ Taxes ■ Bank Loans ■ Bonds ■ Equity ■ Other Debt
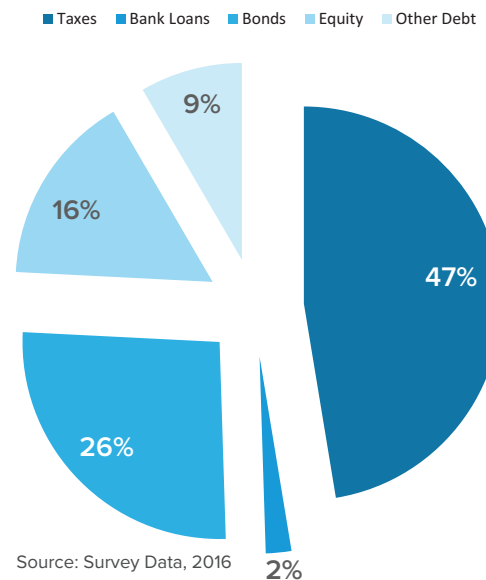
Source: Survey Data, 2016

5.4.6.3 Water and Sanitation Financing

Finally, we discuss the findings on financing instruments as tools for financing urban water and sanitation. Almost half of the public that were interviewed were of the view that taxes were the ideal source of funding for municipal services (Figure 5.37). Most of them however indicated that commercial uses of water should be the central focus of tax collection. While others suggested that imported plastics and beverages should be the focus of taxes (Figure 5.40). Correspondingly, about six in ten members of the public were not willing to pay any direct taxes for the purpose of financing urban municipal services (Figure 5.39). This is a compelling rejection of direct personal tax of any form. It is however uncertain why the public will express such rejection for these important services especially that water is necessary for everyday living and sanitation is at the heart of healthy living. Among the sample, about six in every ten people suggested that government should use some form of financing instrument to fund municipal services in the two cities (Figure 5.41). Interestingly however, 54 per cent were not willing to participate if bonds were issued to fund municipal services (Figure 5.42). On the whole, taxes on commercial activities and related products are the most preferred funding means for urban water and sanitation in Accra and Tema Cities.

Figure 5.39 Would You Participate In Bond Issue For The Purpose Of Financing Urban Water And Sanitation? (%)
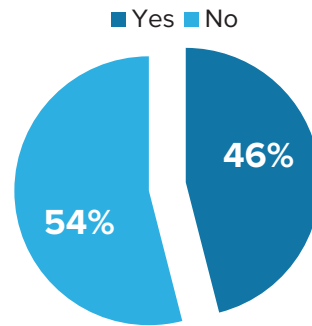
Source: Survey Data, 2016

Figure 5.40 Suggested Means For Collecting Tax (%)

Source: Survey Data, 2016

**Figure 5.38 Should Government Use Financing Instruments To Finance Urban Water And Sanitation? (%)**
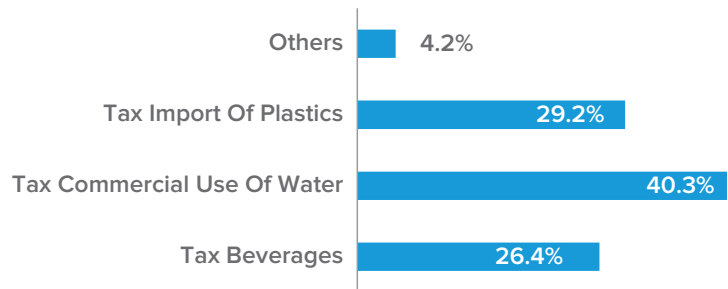
Source: Survey Data, 2016

Figure 5.41 Willing To Pay A New Tax To Finance Urban Water And Sanitation? (%)
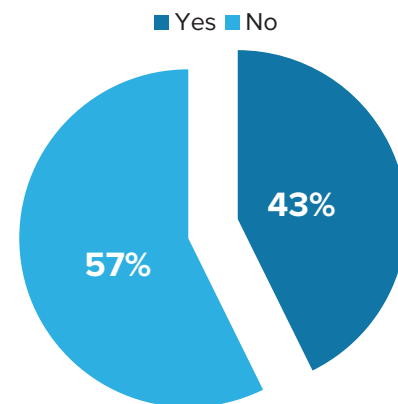
Source: Survey Data, 2016

5.4.6.4 Conclusions

In conclusion, we note that, the use of financing instruments for funding urban social and economic infrastructure have a significant potential for success in the Ghanaian financial system. Publicly issued instruments for water and sanitation will however have the least success. The following section accesses how financial instruments will impact the national financial system.

5.5 Impacts on the Financial System

The objective here is to discuss the various channels through which housing finance impact upon the national financial system. By financial system we mean the sum of the mechanisms, processes, regulations, institutions and people who interrelate in the market for financial instruments.

5.5.1 Assessing the Impacts of Financial Instruments at the Financial System Level, Particularly On the Sustainability and Resilience of the National Financial System

What we refer to as the financial system here is that system which facilitates the process of lending and borrowing, or more broadly, the exchange of funds, between investors and borrowers. Financing instruments on the other hand are tradable assets that include cash, cash equivalents, evidence of ownership or a contractual obligation to deliver other instruments. There are several financial instruments available for financing housing and other urban services as identified previously. These include bonds, promissory notes and loans. They give rise to both an asset and a liability to either party. This makes them an important part of the financial system. In a financial system one factor that can affect stability is defaults by parties to financial instruments. The housing sector has proven to be important in many economies and the financing of that sector is important for economic health. Drawing from the findings discussed above, a factor that could adversely impact Ghana's national financial system with the use of financing instruments is high default rates. A high default rate can lead to

liquidity challenges and cause banking crises. It is therefore important for measures to put in place to forestall the incident of high defaults.

A resilient housing sector can spur rapid economic growth through job creation and increased household spending. Moreover, the financial sector will benefit through its role in providing financing and facilitating transactions between parties within the financial sector. Notwithstanding these positive impacts of the sector, things can go askew with the housing sector and lead to severe consequences. As a matter of fact, the enormity of the influence of the housing sector on the economy is the very reason why it presents high risks to the financial system. It has been found that housing values have implications for economic growth and business cycle movements (Tiwari and Moriizumi, 2003). At least the US sub-prime mortgage crisis of 2007-2009 has taught us that the housing finance sector can impact the financial system adversely apart from the often overly rated positive impacts (McCord, et al, 2011). It can be seen from figure 5.42 that the Ghanaian public does not believe the national financial system can withstand the shocks that are associated with using certain instruments.

Figure 5.42 Is Ghana's Financial System Resilient To Potential Shocks From The Use Of Financial Instruments? (%)
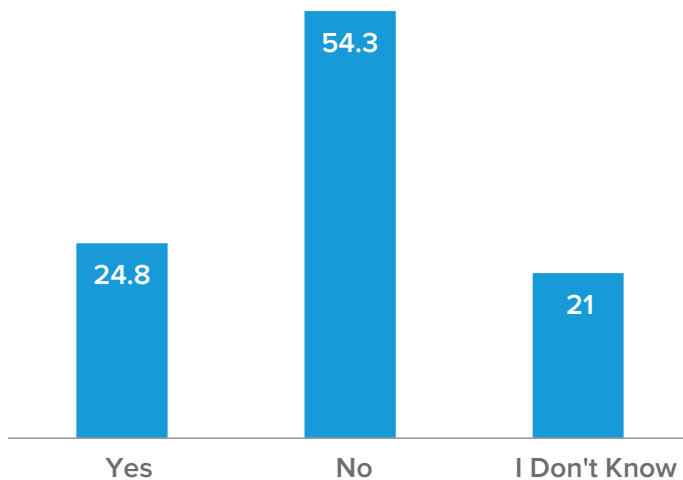
Source: Survey Data, 2016

Figure 5.43 Would Interest Rate Be Affected By Using Financing Instruments To Finance Infrastructure? (%)
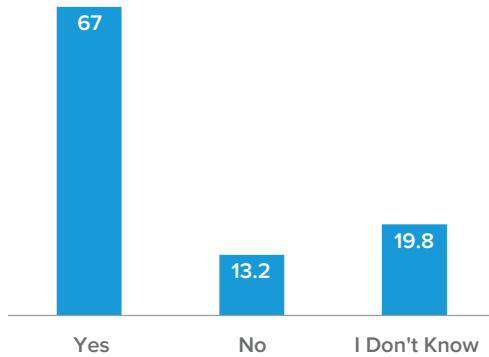
Source: Survey Data, 2016

Figure 5.44 How Will This Affect Interest Rate? (%)
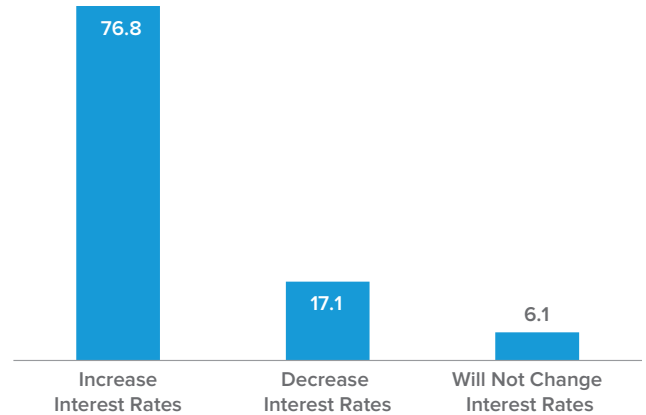
Source: Survey Data, 2016

Apart from the housing sector, local authorities around the world have adopted various financing instruments to finance financing municipal services such as sanitation, provision of water and energy needs (van Dijk et al, 2014). This practice is not just routed in policy but has strong academic backing. For instance Hutchison et al (2016) make a compelling argument for using financing instruments for public infrastructure. Their argument is that: "the introduction of project bonds would be an important innovation, assisting the financing of infrastructure investment at a time when bank lending is likely to remain fragile. The current conditions in the sovereign debt market, where strong demand has forced down yields, has opened up the opportunity to introduce project bonds offering a higher yield to satisfy institutional investment demand for long term fixed income products" (pp208).

The liabilities that are created by these bonds are settled with taxes, rates and fees collected by local government authorities. Needless to mention that as local governments borrow from investors this can reduce the availability of loanable funds to the private sector and can lead to high interest rates, inflation among

others. Figure 5.43 shows that the public believes financial instruments would result in higher interest rates. What this implies is that financial instruments do impact financial systems whichever way it is used. Financial instruments are not in wide use for financing municipal or urban services in Ghana. However, the next section discusses the impact financing instruments can have on the respective stakeholders that lie in the scope of housing and urban services.

It is foreseeable that in the next two decades, financing instruments would become an important part of urban services finance in Ghana especially because civil society organizations have begun pressing for greater decentralization in the country and greater independence of local governments. Also, a recent policy adopted by the government of Ghana to manage public debt seeks to allow Metropolitan, Municipal and District Assemblies (MMDAs), state and parastatal agencies to borrow on their own account. This could give rise to the issuing of bonds by these bodies as done in many advanced countries like the US and UK (Hutchison, et al, 2016).

Figure 5.45 Is The Use Of Financial Instruments Sustainable? (%)
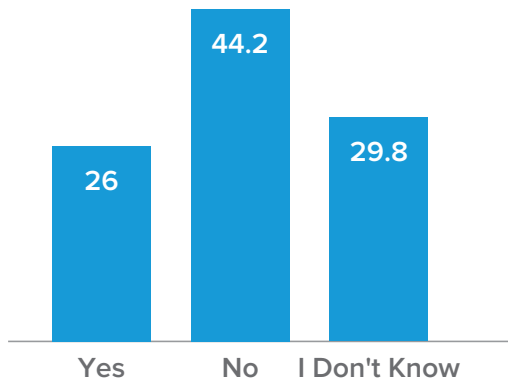
Source: Survey Data, 2016

5.6 Impacts on Sectors

5.6.1 Identifying Issues Faced By Different Actors and Stakeholders in Financing Housing, Infrastructure and Urban Services

5.6.1.1 Access

Access to housing financing is one challenge which many stakeholders in Ghana's housing sector face. The majority of Ghanaian households cannot afford a house at their current income levels. This has already been established above. This includes people in the low and middle income levels. To be able to acquire a housing unit, most prospective homeowners have been found to be likely to use loan facilities such as mortgages. Mortgage repayments in Ghana is however higher than the average income of low and middle income households. Moreover, there is fluctuation in the incomes of the section of the society that is in the informal economic sectors and so there arises uncertainty regarding their ability to repay their mortgage liabilities (McCord, et al 2011). As a result of this, this section of society is excluded from the mortgage market. Ghanaians therefore build their houses with savings over a period of between 10 and 30 years and this often involves at least two generations of household members (Donkor-Hyiaman and Owusu-Manu, 2016).

A section that needs urgent housing assisted is the informal sector workers. Ghana's informal sector employs about 86.1 per cent of the labor force in occupations across farming, small scale agro processing, mineral extraction and trading. Informal sector workers usually have low wages and low savings and so are unable to qualify for loans and other financial products (GLSS6, 2016). They are thus financial excluded, that is, they are isolated from the formal financial sector and have low access to products from the banks and mortgage companies. They therefore tend to rely on financial intermediation offered by the microfinance sector which is characterized by high interest rates. Microfinance companies usually offer short term loans and the loan amounts offered are mostly insufficient to fully finance the cheapest housing units in urban Ghana. Consequently, rental housing units are also the most accessible and these are becoming more and more expensive as a result of supply side constraints.

5.6.1.2 Cost

In a recent study, Al-Homoud et al (2009) found that cost is among the factors which adversely affects urban infrastructure. They find that cost of financing was among the most prohibitive factors to urban financing. The situation is not different for Ghana. When it comes to financing of infrastructure; cost is an important factor that needs to be considered (Akindeke and Iwisi, 2006). These costs cut across the cost of money and the cost of materials. Regarding cost of money, interest rates on financial instruments available to stakeholders is often so high. For instance, the cost of mortgages in Ghana is about 35 per cent in the traditional financial sector and up to 80 per cent in the microfinance mortgage subsector (Donkor-Hyiaman and Owusu-Manu, 2016). This serves to put many prospective home owners off as they are unable to sustain the debt over the long run (Ferguson, 2004). Others include high construction cost, high cost of urban land and high cost of acquiring building permits (Arku, 2009). For tenant households cost of rent is the main issue that poses a challenge that they have to grapple with. Urban household rent for instance ranges between GHC150 for single room dwellings and GHC500 for 2 bedroom apartments. Tenants are mostly required to pay up to 2years rent advance which is a huge burden for the urban lower middle income class

as they find it difficult to raise two years rent since most of them are salaried employees with low salaries (Arku, 2009; Arku, Luginaah and Mkandawire, 2012).

Regarding energy financing, it is observed that the cost of electricity generation has risen steadily as generation has gradually shifted from hydro to thermal and thermal is known to be the most expensive source of electricity generation and its operational expenses fluctuates in a period of crude oil prices instability (Tang, Chiara and Taylor, 2012). Some financing instruments that have been used to control crude oil price fluctuations in recent years have been the government of Ghana hedging programme. Under that strategy, derivative instruments such as call options are obtained to set a price in anticipation of price increases. Unfortunately however, following the implementation of this strategy in the last 8years, prices of petroleum products on the world market did drop significantly from over $110 to less than $40. The strategy therefore could not fully achieve its intended purposes. Another issue related to energy financing is the efficiency in the revenue collection system of the ECG. It is now an open secret that the bulk of unpaid electricity bills is attributable to state and parastatal institutions. This is in spite of the claims of the government that it subsidizes electricity. The non-payment of bills deprives the ECG of the funds required for the improvement in its service delivery.

In the area of transportation it is clear that one key need is the provision of 1st class roads across the country. For most parts of urban Ghana, roads need to be expanded. This will come at extra costs which governments want to avoid. The road sector is financed mainly through the budget of the Government of Ghana and through support from development partners in the form of loans and grants for road and bridge construction. According to Badu, Edwards, Owusu-Manu and Brown, (2012) the major challenge of financing urban infrastructure in Ghana has been investment capacity; implementation and revenue mobilization.

The ministry of roads and highways forecasted that the cost of road expansion and maintenance in the medium term will cost about GHC8billion ($2billion) annually. A fourth of this will meet the financing requirement for urban roads. The ministries revenue projections showed that the government can raise at most 45 per cent of this funding requirement. Taxes on fuels have been used to fund about a quarter of road maintenance. The other 20 per cent is financed from other internal sources such as tolls and fees. The shortfall needs to be met somehow. It is important to find innovative approaches to financing that system to ameliorate challenges facing both the supply and demand side requirements, chiefly to ease congestion and enhance investment in its capacity (Mostafavi, Abraham and Sinfield, 2014).

Over the years the government of Ghana has relied considerably on taxes on fuels to finance much of its obligations in the transport system. These taxes offer stability of revenue and are predicable with a comparatively low administrative burden. It is also difficult to evade fuel tax and so this source has generated substantial revenues for the government over the years. Moreover, fuel taxes could have an added incentive for individuals to buy vehicles that are fuel efficient thus yielding positive externalities to the environment. Road construction bonds represent some financing instruments that can be issued to raise the needed funds to construct roads and the resulting debt can be repaid with revenues from road tolls and other user fees (Hutchison, et al, 2014). A similar strategy can be adopted to finance the acquisition of buses by the Metro Mass Transit Company to provide coordinated urban mass transportation to ease the perennial congestion in some urban areas. The debt obligation could further reduce inefficiency in the operation of the company as the management will be mindful of the need to meet their debt obligation. To collect tolls, one challenge is the willingness of the people to pay.

Chapter 6

Alternative Financial Instruments

6.1 New Housing and Infrastructure Development Challenges

There are several challenges to the provision of new housing and infrastructure development in Accra and Tema. The challenges manifest themselves differently depending on whether the housing development is carried out on a greenfield or brownfield site. Broadly speaking, the main challenges to new housing development relate to issues of land access, cost of construction, development and acquisition financing and infrastructure provision.

6.1.1 Access to Land

Access to litigation free land at an affordable price remains a big challenge to the delivery of new housing especially within the city of Accra. In the relatively well-planned and built-up areas of the city, most of which are lands held and managed by the government, intense competition for the limited available sites has resulted in a surge in land values over the past two decades. It is common for lands in areas such as Airport Residential Area, Cantonments and Ridge to report transaction amounts between $2,000,000 and $3,000,000 for an acre of land. The results of the rising land prices in these areas is that they have been almost exclusively reserved for the high income bracket and effectively out of reach for the middle class not to mention the lower and lower middle income households. Incidentally, in close proximity to some of these areas are situated settlements that are fairly serviced with basic infrastructure but largely populated by lower to lower middle income households in old and sometimes dilapidated structures characterized by high densities and lacking in some basic amenities. The challenge in providing new housing to take advantage of existing infrastructure through redevelopment of these areas is the fragmentation and uncertainty regarding the ownership of lands that make it almost impossible for developers to use the price mechanism to get access to lands.

More so, most of the current holders of lands in these communities inherited them from other family members and often there are no proper documentation showing who the legal owners are especially in situations where several children inherited from a parent. Not surprisingly, the vast majority of new housing developments within the city of Accra are concentrated in the upper income areas with limited or no activity in lower and middle income areas. Obviously, there are other explanations for the lack of development of new housing in the lower and middle-income areas as will be discussed later, however, the difficulty in getting access to lands remains one of the biggest challenges.

In the case of housing development on greenfield sites, which tend to be located in the neighboring towns or suburbs, the main challenge with respect to land access is multiple sale of land, which gives rise to endless litigations and delay in executing projects. It is by far easier to provide new housing in these areas for the lower middle income households albeit at a great cost to the environment and limited accessibility to work areas and the central business district. Consequently, one would observe that most of the new housing in both Accra and Tema take place at periphery of both cities.

6.1.2 Construction Costs

For most housing projects, construction cost is usually the largest cost item. In effect, the cost of housing is largely dependent on the cost of constructing the structure. The Ghanaian construction industry has witnessed a rapid rise in the cost of construction over the past two decades. This is clearly evidenced by the graph below, which presents the growth rate of prime building cost and the rate of inflation over the period 2001 – 2011 (data on prime building cost is only available up to 2011). As the figure shows, the rate of growth in building cost has been higher than the rate at which general price levels have increased over the period. On average, prime building cost has increased by almost 23% yearly as against annual inflation rate of about 16% over the period.

To gain an understanding of the underlying forces that may be causing this persistent rise in the cost of construction, it is important to disaggregate the cost into the various elements. According to the Ghana Statistical Service' breakdown of prime building cost, building materialmakes up two-thirds of total building cost. Therefore, the starting point in understanding the phenomenon of rising cost is to take a closer look at the materials of construction. The predominant materials of construction for new housing in urban areas such as Accra and Tema are either cement-based products or other imported items/components. The cost of the imported materials in local currency is influenced largely by the Cedi/Dollar exchange rate and judging from the depreciation that the Cedi has experienced over the past decades, it should not be surprising to observe the sharp increase in the cost of construction, which has had a major effect on housing affordability. Figure 6.2 presents the annual rate of change for the major components of construction. Interestingly, the cost of labour experienced a relatively higher growth than materials even though both components grew at more than the rate of inflation.

Figure 6.1: Annual Rate of Change in Prime Building Cost and Inflation Rate
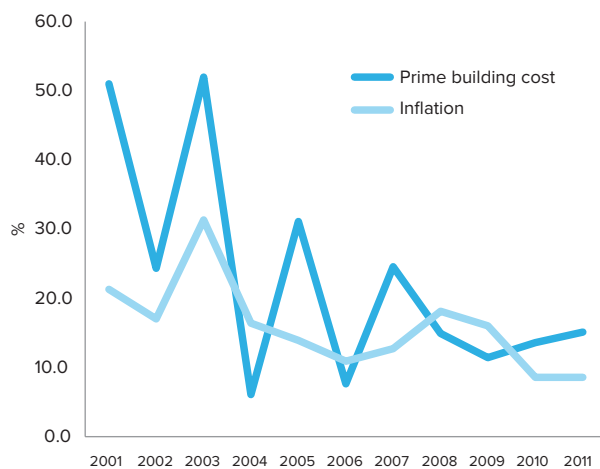
Source: Ghana Statistical Service

Table 6.2: Annual Rate of Change in Major of Components of Construction Cost
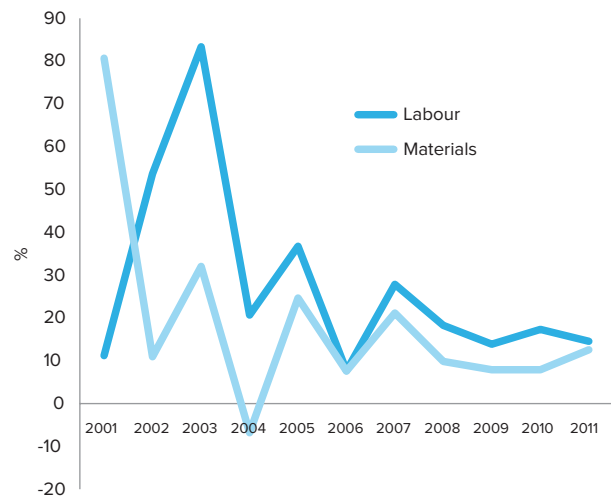
Source: Ghana Statistical Service

6.1.3 Development and Acquisition Financing

The capital intensive nature of housing investment makes access to the appropriate source of financing central to the provision of housing. Developers require access to construction loans to undertake housing projects of any meaningful scale. Unfortunately, the banking system does not provide construction finance on a scale that enables developers to provide the volume of housing needed to make a dent in the nation's housing deficit. There are several reasons the banking industry may be shunning this segment of lending including the high risk inherent in construction loans, the lack of long-term financing opportunities for developers to pay off the construction loans once the projects are completed among others. Closely related to the lack of construction finance is

the absence of a well-functioning residential mortgage market that can deliver cheaper financing for purchasers of housing units. There are only a handful of financial institutions that offer mortgage products in Ghana and not surprisingly the products offered by these institutions are only accessible to the upper middle and upper income classes. The evidence in the 2010 population and housing census suggests that only about 0.8% of home acquisitions are done with mortgage loans implying the need for households to rely on mainly personal savings to accumulate the required funds. As a result, developing housing for this segment of the market remains very risky as effective demand is often uncertain. This further exacerbates the challenges developers face in obtaining construction finance.

6.1.4 Infrastructure

The lack of basic infrastructure such as roads, water and electricity is a major bottleneck in the delivery of housing in Accra and Tema. There are two tales to the infrastructure problem. In the old built-up areas of the cities, a certain level of infrastructure exists albeit it requires modernizing and expansion to respond to the growing population and denser redevelopments. In the newly developing areas, however, no infrastructure exists and this has two implications: Firstly, housing developers who are forced to take on the responsibility of its provision have no other option but to pass on the entire cost to the final purchasers making the price of houses prohibitive and unaffordable to the lower and lower middle income earners. This has inadvertently constrained most developers to the upper middle income segment of the market. Secondly, to overcome the affordability hurdle, households may choose to build their own houses in places where basic infrastructure is non-existent and hope that the government at some point in the future will provide such basic infrastructure. The evidence suggests that most households acquire housing by building on their own often in inaccessible and poorly served areas. Not only does this impose inconvenience on households, it has also led to the haphazard urban sprawl the

Greater Accra Metropolitan Area (GAMA) has experienced with its attendant negative impact on the environment. It has become virtually impossible for local government authorities to control the actions of tens of thousands of households carrying out building activities across different geographic areas.

6.2 Approaches to Reducing Cost of Affordable Housing

There is an acute shortage of affordable housing in the city as indicated by the large affordable housing gap. In this section, four strategies for reducing the cost of affordable housing are explored.

6.2.1 Reducing Construction Costs

Majority of households in Accra undertake building projects over several years in what has become known as incremental building instead of the alternative mode of buying already developed houses. As a result, any effort at seeking to reduce the cost of construction must not overlook this fact. The main costs that are relevant to households who build incrementally are the direct cost of construction including materials, labour and equipment costs. There are two options by which the cost of construction can be reduced. These include adopting:

- Alternative building material that are cheap but durable and locally available

- More effective and efficient construction technologies aimed at reducing waste.

Currently the most widely adopted material used in housing construction is cement-based products. An alternative to the cement based products are clay based products such as bricks and pozzalana. These products are made largely from locally-sourced materials that are readily available in several parts of the country. The Building and Road Research Institute, which invented the pozzalana material, has set up a manufacturing plant in partnership with private investors to commercialize its production.

The Institute estimates that the cost of pozzalana cement is about half the price of Portland cement and given recommended ratio of 2:1 for Portland and pozzalana cement respectively, expenditure on cement can be reduced by at least 15%. Brick production though potentially a viable venture is currently being produced on a low scale making them quite expensive compared with sandcrete blocks. Several aspects of current construction practices lend themselves to waste. Most aspects of building components are constructed on site with very limited use of pre-fabricated materials. It is, thus, possible to reduce the cost of construction by reducing waste and ensuring speed by streamlining the construction process through the use pre-fabricated materials.

6.2.2 Lowering the Cost of Land

High cost of urban land is a major constraint in the delivery of affordable housing especially within the areas of the city that are fairly well planned and provided with some infrastructure such as all-weather roads and electricity. The main reason for the rising prices of land is the limited supply of lands with easy accessibility to workplaces and other services leading to an imbalance between the demand and supply of accessible sites for housing. In the urban fringes, land prices are less prohibitive except that the lack of an efficient public transport system makes such areas inaccessible for the working class. Furthermore, the lower and lower middle income earners who lack the means of transport to be able to locate at the urban fringes, are also effectively priced out of the housing market in the urban areas.

Increasing the supply of land for housing in suitable locations will ease the pressure on the existing stock of land for housing and thereby slow the growth in land values in the inner core and possibly lower the price of land at the periphery. The supply of land for housing may be increased through the opening up of areas that are ripe for development with basic infrastructure such as roads, electricity, water etc. and making them available to developers with a requirement to include an affordable

housing component in their projects. Public funds will be required in providing this infrastructure and in this regard a Housing Infrastructure Fund should be set up to provide the needed funding. For this strategy to work, the local authorities would need to foster a closer relationship with the major land owners in the city to draw up the mechanism for implementation. Improving accessibility to business and work centres through an efficient public transport system is central to the success of this strategy. Another way to increase the supply of land is to maximize the use of land already committed to urban use by promoting the use intensity of under-utilized sites and the development of vacant sites. It may be necessary to reform the property tax regime to shift the emphasis from the taxation of structures to a land-based system so as to discourage the holding of land for speculative purposes and encourage denser developments.

6.2.3 Lowering the Cost of Finance

Ghana has one of the highest mortgage interest rates in the world due mainly to lack of long-term funds, persistently high inflation and lenders' inability to discriminate among borrowers of varying risk arising out of inadequate information about borrowers. The unstable macroeconomic environment remains an impediment to developing a vibrant long-term debt market and the lowering of the cost of funds. The need for price stability, low fiscal deficit and debt levels are well recognized and the recent efforts including the 3-year IMF program attest to this. In the meantime, there is immense potential to direct the flow of long-term funds to the housing market provided the risk-return trade-off is competitive relative to other assets particularly short-term debt instruments and the appropriate market is created for the trading of such securities to guarantee a reasonable level of liquidity. The new pension regime, instituted in 2008, has enhanced an economy-wide mobilization of long-term funds, which together with other sources including life insurance premiums serve as a ready pool of funds for housing finance.

Figures from the National Pensions Regulatory Authority (NPRA), presented in Figure 6.3 below, indicates a steady growth in the funds under the management of private pension schemes licensed by the Authority. As at the end of 2015, these schemes had mobilized a total of GHC 4.67 billion representing 3% of GDP rising from about GHC 805 million in 2012. This is besides the amount being managed by SSNIT, the only public pension fund scheme, which had about GHC 9 billion under management as at the end of 2015. Notwithstanding the potential availability of long-term funds, a lingering issue is the high cost of funds, which renders mortgage loans out of the reach of many households. Incidentally, the 2008 pensions Act allow contributors to use their contributions to secure mortgage loans, which can have the effect of lowering the risk of default and hence interest rates.

6.3 Opportunities for New Instruments for Low Carbon and Climate Resilient Development

Several financing mechanisms have evolved over the last couple of decades to mobilize both public and private funds in addressing the needs of low carbon and climate resilient developments. A report commissioned by the United Nations Environment Program (UNEP) highlights a number of public finance mechanisms designed to mobilize commercial financing for climate mitigation related activities. The World Resource Institute (WRI) also provides a glossary of climate financing instruments that are fairly similar to the instruments identified in the UNEP report.

Broadly, the financing instruments are aimed at either providing funding or absorbing all or part of the risk for climate sensitive investments. A variety of debt or equity products have been designed to provide funding for climate related projects either directly or through financial intermediaries. As correctly pointed out in the UNEP report, the success of a financing instrument will depend on whether it is adaptable to local market conditions and targets the most reliable technologies and promising projects. Generally, there are two ways in which funding for low carbon and climate resilient (LCCR) developments can be targeted in Accra. First, funding can be provided for city-level projects that seek to build new systems or modify existing systems to be compliant with the goals of reducing GHG emissions and making the city's infrastructure climate resilient. This approach requires that the city is entrusted with the responsibility of providing the infrastructure or service and that there exists gaps in the financing of viable projects.

It is reasonable to presume that city level projects will enjoy economies of scale and engender more efficient utilization of resources. However, such projects are often complex and require huge capital outlays, which can hamper or delay implementation. The second approach is to fund several small-scale projects at the community or household levels. In this case, communities or households are supported with funds to undertake improvements or install

Figure 6.3 : Funds Managed by Private Pensions
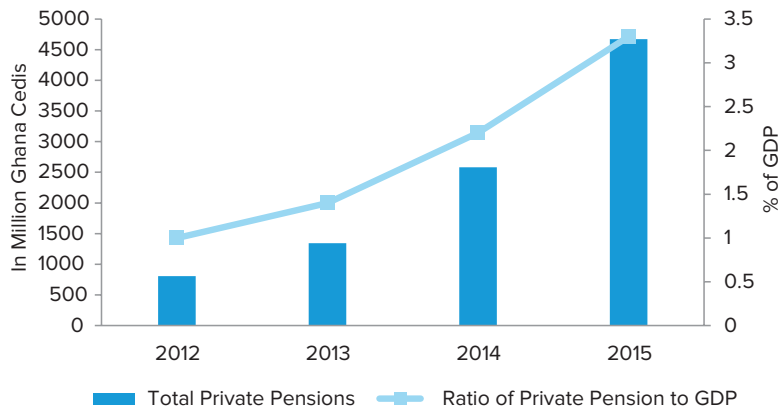
Source: National Pensions Regulatory Authority (NPRA)

systems such as solar or water harvesting technologies. Clearly, the two approaches serve different purposes and are not mutually exclusive. Thus, to be effective financing instruments must target projects at both levels.

Table 6.1: Financial Instruments to Support the Delivery of Affordable Green Housing Development

Instrument	Purpose	Target	Source of Funding
Green and Affordable Housing Research and Development Fund	To support the development and promotion of alternative locally made low carbon and climate resilient building materials.	Grants and soft loans to qualified research institutions and private firms.	Government of Ghana Development Finance Institutions (DFIs)
Incremental Building Loans	To provide construction loans in a manner consistent with incremental building practices.	Lower and middle lower income households	Local Financial Institutions with technical and financial support of DFIs
Green Loans Programme	To provide loans for the installation of solar panels and water harvesting systems in new and existing houses on terms that match monthly repayments to savings in utility costs.	Lower and middle lower income households	Local Financial Institutions with technical and financial support of DFIs.
Affordable Housing Development Loans	To provide construction loans at concessionary terms to developers engaging in affordable housing projects that fall with a given price range and incorporate green features.	Real Estate Developers	DFIs through Local Financial Institutions
Housing Loans Guarantee and Support Program	To provide guarantees for lower and lower middle income earners who would otherwise not qualify for conventional mortgages and long-term funds to mortgage finance institutions for on-lending to the lower and lower middle income earners at below market terms.	Lower and lower middle income earners	DFIs through Local Financial Institutions.

Source: Authors, 2017

It is pertinent to note that both the cities of Accra and Tema are not directly responsible for the provision of housing and corresponding infrastructure and services such as water, energy and transport in the city. In the energy sector, three separate state enterprises; the Volta River Authority (VRA), Ghana Grid Company (GGC) and Electricity Company of Ghana (ECG) are responsible for the generation, transmission and distribution of power respectively in meeting the energy needs of both residential and commercial consumers including lower and lower middle income households. In recent times, independent power producers have entered the market to complement the efforts of the state enterprises. Similarly, water supply to residential and commercial consumers is carried out by another state enterprise, Ghana Water Company Limited (GWCL). In the transport sector, private operators of taxis and trotros (mini-vans) services dominate in the city with the main mass bus transit operated by a state-owned enterprise, Metro Mass Transit. Another central government project, the Bus Rapid Transit (BRT), which is being funded by the World Bank and other partners, is currently being implemented for the GAMA area. The only service that is directly provided by the city is waste management.

Given the nature of infrastructure service provision and the extent of decentralization, opportunities for launching new instruments for low carbon and climate resilient developments in the housing as well as associated infrastructure and services are presented in table 6.1.

6.4 Improving Financial and Technical Support at the City Level

The following are some recommendations to improve the efficiency and effectiveness of financial and technical support to the cities of Accra and Tema.

6.4.1 Recommendation for Improving the Efficiency and Effectiveness of Financial Support

Firstly, financial support must be insulated from the bureaucracy in the city and targeted at specific projects with private sector participation. This will ensure that such support is not stymied by existing bottlenecks in the local governance system while at the same time harnessing the private sectors' efficiency in project implementation.

Secondly, financial support must be channelled through the financial system by using institutions or intermediaries that serve the lower and lower middle lower income households and have developed the tools for assessing and reaching these households. Institutions such as Microfinance, Savings and Loans firms tend to serve the households that FRUGS may be seeking to reach and it is important that these institutions instead of mainstream universal banks are used in providing any financial support.

6.4.2 Recommendations for Improving the Efficiency and Effectiveness of Technical Support

First, technical support to the city administration should be aimed at enhancing its capacity to develop a resilient and green housing and infrastructure strategy and provide an effective

regulatory oversight in its implementation. In particular, the technical support must help to improve the city's use of its land use regulatory powers to provide incentives for developing resilient and green housing and infrastructure.

The second way of improving the efficiency and effectiveness of technical support is to use existing structures and practices at the local level as the bases for promoting the transition to a greener future. Thus, technical support must not aim so much at introducing an entirely new way of housing and infrastructure development but rather must find ways of incorporating green features in existing approaches. In this regard, the knowledge and expertise of local small scale artisans in the building industry would need to be enhanced through training programmes.

To sustain the push to a greener and resilient urban environment, there is the need for a review of the curriculums of all programmes that relate to urban development in the institutions of learning especially at the tertiary level to align them to modern trends in the development of green developments. The next generation of architects, planners, developers etc should be equipped with the knowledge and skill to not only implement existing technologies but also to innovate newer and more efficient ways of producing affordable for the lower and middle income segment of the market.

6.5 Opportunities for International Financial Institutions and Agencies

6.5.1 Support to Financial Sector Development

The IMF 2011 report on Ghana's Financial Sector highlights the scarcity of long-term funds as one key constraint that undermines the efficient functioning of the financial system and its contribution to economic development. Incidentally, housing and infrastructure developments require long-term funds and the scarcity of this kind of financing will pose a serious challenge in implementing the a resilient and low carbon housing and

infrastructure strategies. The lack of an active long-term debt market is partly the result of the unstable macroeconomic environment and it will be very difficult to stimulate activity in this market without first addressing issues with high inflation, fiscal deficits etc. In addition to a stable macroeconomic environment, constraints in demand and supply of long-term instruments would need to be addressed.

On the demand side, the needs, preferences and concerns of long-term institutional investors would have to be ascertained so as to enable the issuance of the appropriate securities. As demonstrated earlier, there is a growing pensions industry, which should provide a strong demand base for long-term debt instruments. However, the lack of Government benchmark long-term securities hinders pricing and constrains demand. As an alternative, the International Development Agencies (IDAs) can spearhead the engagement of long-term institutional investors with the aim of generating, capturing and recording the demand for specific instruments to support an efficient price discovery (a process known as "book building"). The IDAs can leverage their credibility and strong financial backing to provide comfort to investors and where necessary, guarantees could be provided to foster greater demand. On the supply side, the lack of municipal and corporate bond issues by the Metropolitan Assembly and private entities due largely to insufficient capacity impact negatively on the development of an active long-term debt market. The IDAs can assist the Metropolitan Assembly and private entities engaged in green housing development and infrastructure projects to build their capacities to bring to market the appropriate securities.

6.5.2 Financing Opportunities in the Cities

Both Accra and Tema face serious challenges in providing decent and affordable housing for the growing number of lower and middle lower income households. The large housing supply deficit is an indication of a strong latent demand and the missing link seems to be finding ways to match this demand at the price point that will be affordable to majority of households either for rental or owner-occupied

housing. Unfortunately, the sort of patient capital that is required to develop innovate mechanisms to reduce the cost of construction through research and experimentation is virtually absent in both cities. It is increasingly becoming clear that the business-as-usual model is unlikely to be able to deliver the type of housing that is required. There is an opportunity to forge partnership between the private and public sectors with the support of IDAs in pursuit of a stated goal of delivering housing at a specified price point. Achieving substantial cost reduction would improve the return on investment, which will serve as catalyst in attracting private capital to this segment of the housing market.

Financing opportunities also abound in the transport sector of both cities especially in the rail transport sector, which has the potential to ease accessibility and open up the periphery of both cities where the cost of land is less prohibitive and likely to support the delivery of affordable housing. Investments in urban transportation is typically funded by public funds but new models of incentivizing private capital in a public private partnership would need to be explored due to the severe financial constraints both the local and central governments face.

6.5.3 Capacity Building Opportunities

The capacities of the two cities would need enhancing especially in the area of local financial resource mobilization and the development of mechanisms to provide infrastructure. In particular, the capacity to the cities in administering property taxes needs to be substantially enhanced. The cities would need support on issues such as the creation of a geo-referenced property database capturing all properties and their current rateable values as well an efficient collection system. In addition, the cities would need support to explore other ways of raising financing besides the traditional sources. For instance, financing mechanisms such as the use of municipal bonds, tax increment and value capture financing could be used if the city develops its capacity to take advantage of these financing opportunities.

Also, the capacities of financial intermediaries would need to be enhanced to enable them come to terms with the urgent need to transition to a greener economy, identify financing opportunities and mobilize long-term funds locally and internationally to support resilient and low carbon investments. In addition to building the capacities of traditional financial institutions such as commercial banks, insurance companies and pension funds, others such as private equity and venture capital funds would need to be steered towards climate financing by constantly engaging and linking them up with opportunities.

6.5.4 Partnership Opportunities

There are several opportunities to forge partnerships to develop and share knowledge relating to the key objectives of FRUGS with the following institutions and organizations:

1. Professional Organizations including the Ghana Institute of Architects, Ghana Institute of Planners, Ghana Institution of Surveyors etc.

2. Academic and Research Institutions such as KNUST Faculty of Built Environment and Building and Road Research Institute

3. Trade Associations such as Ghana Real Estate Developers Association

4. Non-Governmental Organization such as Ghana Green Building Council (GHGBC)

6.5.5 Opportunities for Launching and Developing New Instruments

The Ghana Green Building Council with the support of the Green Building Council South Africa (GBCSA) has undertaken the first certification of a green building in Ghana using its Leadership and Excellence in Green Designs (LEGD) assessment tool. The building in question is an office property located in the Airport City commercial enclave in the city of Africa. The experiences and knowledge acquired could be extended to develop assessment tools for green housing developments. Such a tool would serve as a useful guide for developers who wish to engage in green developments. It would also present city authorities with a framework to revise the building regulations to incorporate green elements in new developments. Moreover, there are currently no known indices for house prices in the country. This presents an opportunity for FRUGS to offer technical and financial support to create both conventional and green housing index. These indices would provide market participants and policy makers with useful information regarding the trends in the prices of houses and housing affordability.

Chapter 7

Project Identification

7.1 National Priorities for Housing, Infrastructure and Urban Services

The priorities of the nation should focus on providing equitable housing, other social and economic infrastructure. This should include the provision of affordable housing facilities for residents in all districts, motorable roads across every suburb and to the very interior of the country side as well as sustainable sanitation measures for all. In particular, the National Housing Policy, launched in 2015, seeks to achieve the following goals:

1. To provide adequate, decent and affordable housing that is accessible to satisfy the need of all people living in Ghana

2. To ensure that housing is designed and built to sustainable building principles leading to the creation of green communities.

3. To ensure that there is participation of all stakeholders in decision-making on housing development and their allocation in their localities

4. To ensure adequate and sustainable funding for the supply of diverse mix of housing in all localities.

The following sections deal specifically with priorities for the cities of Accra and Tema.

7.2 City Priorities for Housing, Infrastructure and Urban Services

This section highlights critical priority areas for urban infrastructure and municipal services. Regarding housing, priorities are identified for three distinct groups of urban residents. These groups include those living in suburbs that are widely considered to be slums, native suburbs and new communities that will be occupied by middle income household. The middle income household projects will run perpetually while the other projects will be definite. For urban infrastructures and services, there is homogeneity regarding needs of all residents, hence the priorities are not classified. These priorities are highlighted next and proposed

projects are subsequently enumerated. Overall, the objective of these projects is to upgrade Accra and Tema into modern cities.

7.2.1 Priorities for Housing

The most compelling housing needs of Ghanaian cities are the need to enhance the housing standards and conditions of the people. As identified in chapter two, a significant proportion of urban residents live in slums and slum-like neighbourhoods. Housing priorities of the cities can be analysed on the basis of these classifications and a third group which comprises of the migrant middle income earner. The issues raised here are based largely on findings and discussions in chapter two.

Most of the time, areas considered to be slums are those where poor rural-urban migrants dwell. These areas usually have an overwhelming majority of their dwellings being made of light cheap wood products, mud or other low quality materials. These people have no access to basic facilities like toilets, bathrooms, kitchen and water. As a result of this, the people living in slums in Accra and Tema are the most responsible for open defecation in the cities as has been reported by the GLSS6. They bath in the open and cook in the open. Due to their poverty, they cannot afford clean cooking energy and so they use wood and charcoal as fuel. Fire made of wood is notorious for emitting smoke into the environment hence polluting the atmosphere and exposing the people to many terminal diseases. They sometimes rely on broken pipelines to get water and it is not clear if these broken pipelines are accidental or are deliberate actions by these residents.

For some purposes, residents rely on water flowing through gutters and lagoons in the city that are considered to be not too dirty. Most people however get their drinking and bathing water from community water vendors who own standing water taps at the slums. Urban housing priorities should be to ameliorate or totally remove these living conditions not just for the sake of the urban slum dweller but also for the rich and middle income for

reasons mentioned in the next paragraph and for achieving government's own development objectives.

The living conditions in slums do not only affect the slum dweller but also the urban middle income and the rich. Much of the food sold on the streets of Accra and Tema are prepared in slums under these conditions. The average middle income worker in the two cities lives their homes for work before 6am and so some are unable to prepare breakfast for the family during working days. This means that they have to purchase food sold by the roadside from these slum dwellers. Most people take lunch from the streets as well. Thus, whatever consequences the poor sanitation and living conditions has on the slum dwellers will trickle up eventually to the middle and upper income brackets. It is therefore necessary that housing priorities in cities do not neglect slums. It is necessary to upgrade slums using innovative programmers that do not exert undue financial burden on slum dwellers. We propose some of these measures subsequently in section 7.4. The term upgrade is not used here to mean maintenance of slums but that they should be eliminated in a manner that though significant does reduce the financial burden on stakeholders and not necessarily offer the extreme poor the same housing conditions as the "very rich" in the cities.

What we term "Slum-like" suburbs on the other hand refers to those suburbs that are inherited by poor indigenes of the cities. These people consider these places their hometown and so they have been living there since their ancestry. A majority of these suburbs located in the Accra and Tema cities are made up of housing units that have been occupied by several generations of the same family. These housing units have for the most part not been renovated since they were first constructed and a good number are made of mud or some other indigenous building material or technology. Moreover, these suburbs were not formally planned from the beginning and no attempts have been made to plan them. The people have great memories, myths and religious and cultural heritages that are associated with their localities and so they do not want to change the status quo. Besides, each housing

unit is owned by an entire family, and some members who are conservative, and so it is not easy to reach a decision intended to change the status quo. The distinguishing feature of these suburbs is that they are not occupied by only poor people but by people who can be considered to be middle income earners and who could have afforded alternative dwellings but have decided to continue to live in these areas for the same reasons just stated. These suburbs however generally have better sanitation conditions because traditional authorities (and family members) exert some minimal authorities in ensuring good sanitation. A majority of the people who indicated in chapter two to be living for free in their current dwelling live in such suburbs. These suburbs are also a priority for urban housing.

We believe that if the housing needs of these two groups are met, the housing need of the cities will be significantly improved. Many of the residents interviewed had indicated that they know they need alternate housing but are unable to afford to rent or acquire alternative housing. A third group that is relatively better off is the migrant urban middle income earners. These people mainly live in rented or owned apartments in the cities' centres or new suburbs in the fringes of the cities. This class of people are the ones who are currently very likely to be able to afford the so called "affordable housing" units that are being constructed by the government across the country. They are also more capable of taking up mortgages to acquire homes over their working life if mortgages are appropriately packaged and marketed to them. The housing needs of this class should be met by entirely commercial projects.

7.2.2 Priorities for Infrastructure and Urban Services

Infrastructure can be categorized into social and economic. Infrastructure in the two cities can be generally considered to be better than most other parts of the country. This is largely as a result of the brisk economic activities in these areas. Priorities of municipal services are in the areas of sustainable waste management and constant water supply. In the suburbs occupied

by the low income bracket of the two cities, household solid waste are collected in bins, empty cartons, old oil containers/gallons and baskets and sent to a central point where there is a bigger community waste bin. These bins are commonly located near public toilets and are managed by representatives of the local government office. Throwing household waste in these community waste bins does not attract a fee but usage of the public toilet attracts a fee. The bins are collected and emptied in an irregular manner by trucks designated by the local authorities to do this. These trucks include both state owned trucks and trucks belonging to private waste management companies contracted to provide services to the local authorities. In some places, there is no community waste bin, or it may not meet the requirement of the community, hence the residents will dump their waste in the open. It is thus common to find many isolated "small" and "big" refuse heaps along many locations in these areas. Sometimes the designated trucks may just pick these ones up as well but often these get burned. Burning of waste is generally considered harmful to the environment; it is common in many parts of the two cities.

For suburbs where the middle income bracket lives and some of the suburbs identified as "slum-like", trucks collect solid waste directly from the gates of residents at a fee. Trucks include motor tricycles which come round the neighbourhoods to collect waste between 6 am and 10 am and again from 4pm to 6pm. A feature of waste management in Ghana is that solid waste is not separated. This makes it difficult to undertake recycling. Recycling is important because, one major challenge faced by waste management firms and local authorities is the fact that the cities are running out of options for landfill sites. City authorities have resorted to using landfill sites located in communities outside the cities. There is however growing resistance to the siting of land fill sites in most communities hence limiting the prospect of continuous availability of landfill sites in the future. It is thus urgent to adopt alternative waste management technologies in the cities.

Faecal and other liquid waste are disposed off mainly into the lagoons located in the cities or into the sea. Public toilet are used mostly by the poor and the local government authority takes responsibility for managing and disposing off the faecal matter while private companies and sometimes the local government's trucks serve the middle income who have private toilet facilities. Other liquid normally passes through the network of gutters.

One way forward in improving upon urban sanitation is to promote a culture of waste separation to allow for recycling. Another way forward is to promote private toilet facilities and educating the urban poor on the need to maintain a clean environment. Priorities in sanitation should therefore include ensuring proper handling of household waste through access to appropriate waste containers and education of the poor on best waste management practices. Trucks designated to collect refuse from central points should do this as regular as daily to ensure that solid waste does not remain at the refuse sites for so long. Also, incineration and recycling should be explored. Incineration has the potential to produce energy to supplement the existing supply and to ensure energy security in the cities. It is also important that an aggressive move should be made in a period of at most 6months to clean the cities of all forms of filth. This aggressive move can have the effect of sending a strong signal to the people that a new era of good urban sanitation has dawned and together the above measures and with education will achieve a cleaner and healthier environment.

Priority areas in urban energy can be mainly considered in the area of cooking energy. Cooking with wood and charcoal are not environmentally friendly. Meanwhile, as identified in chapter two, there are some houses in the cities that do use these forms of cooking fuel. Efforts should be made to discourage these energy sources and promote environmentally friendly cooking fuel.

The major challenge with water is access. This should be the foremost priority for water supply in the cities. Emphasis should be placed on improving access to water. As noted in chapter two, a good number of the residents do not have regular flow of water into their private residences and so have to commute long distances to get water. Many of them were willing to pay more for water if access will be improved and so it is behoving on the state to ensure improved access.

In the area of urban transportation the priority is first of all to expand the road sizes to ease congestion. Alternatively, reliable mass transit options could be provided to ease congestion; however, it does not seem that this will be effective. Government effort to provide urban mass transportation in the past has done little to ease the situation. Residents expressed willingness to pay tolls if access were improved. Government can expand the roads though PPPs and commercialise priority lanes that will be free of congestion at a modest fee. Current efforts at building overpasses in the cities should be expanded.

Figure 7.1 Role of Stakeholders Waste Disposal in a Typical Suburb of Urban Ghana

Source: Various

7.3 Financing Opportunities for Project Pipelines

7.3.1 Equity Finance

Stakeholders can achieve these priorities using equity financing. This can be done in two ways. One way is for the government to establish a state housing or use existing quasi-state entities which will provide housing for residents of the two cities (Arku, 2009). These entities will be responsible for supplying affordable housing in the form of both rental units and for outright purchase or on mortgage bases. This will mean that the state will become an active player in the housing industry as an equity stakeholder in a housing entity. Secondly, equity financing can be implemented using another approach where the government pays part of the cost of acquisition of housing units for residents. The proportion paid can range from one third to half of the cost (Zhou, 2014). Government becomes a co-owner of the housing unit with equity stake in the unit. The household can live in the unit for any period but they cannot transfer its stake/ownership in the unit to another person or entity except to the government. Zhou (2014) argues that this approach eases the burden of cost of acquisition for occupants. In case the household wants to offload its stake, government will be entitled to acquire that stake. The government then reallocate this unit to other lower middle-income households on similar terms. Thus this option prevents people from acquiring "affordable" housing units only to resell.

State involvement in the housing sector is not new in Ghana (Tipple et al, 1998; Konadu-Agymang, 2001). State involvement in the past did not however prove sustainable (Arko, 2009). This new approach will however be more sustainable as it will include some private involvement (Karley, 2008: Arku, 2009). The National Housing Policy (2014) has hinted of the desire of government to get involved again in the housing sector. We propose that this involvement can be in the form of equity finance for the lower and upper middle income urban households. This financing strategy has been successful in China (Zhou, 2014). In chapter five, we explored details about how receptive the public will be to various forms of financing. This included equity financing.

7.3.2 Debt Finance/Private Sector Financing

Debt is another method that could be used to raise financing for urban infrastructure. This approach was explored by Yildiz (2014) for financing energy infrastructure in Germany. It can however be used to finance every other form of infrastructure, including housing. Bonds can be publically issued for finance urban housing and infrastructure projects (Hutchison, et al, 2016). This method of financing urban housing and social infrastructure is reported by Al-Homoud, et al, (2009) to be in active use in Jordan. In the case of Jordan, bond financing was dominated by banks who issued bonds in order to raise funds for lending to the housing sector. Our findings in chapter five demonstrated that the Ghanaian public was willing to support this method of financing urban infrastructure (housing, energy and transport infrastructure). The state could establish commercial entities that will be funded by bonds or existing entities could raise long term bonds to fund projects. Proceeds from these projects will be used to repay these obligations to investors.

The section of the public we interviewed rejected the use of taxes to finance housing projects but were willing to support debt financing. This is understandable giving that the Ghanaian real estate industry is among the growing and flourishing sectors of the economy and many residents of the two cities are willing to contribute to a venture in that industry if such contribution is presented as an investment. There is therefore a potential for debt financing to be successful in the funding of urban infrastructure projects. Debt instruments do not necessarily have to be issued by a state entity. The Private sector can use these instruments to finance the urban infrastructure and municipal service needs and recoup their capital through fees and rents (Gbadegesin and Aluko, 2014). Private sector involvement has some critical advantages and the role of government could be limited to creating a supportive regulatory, legal and economic environment that will make the private sector to thrive (Arku, 2009).

However, as the private sector is motivated mainly by profits, we recommend this financing mode be adopted only for middle income housing projects.

Public-Private Partnerships can also be used for financing road infrastructure. This method of financing comes in the form of an agreement between a private entity and the government where the private entity finances road or other transport infrastructure in return for the right to collect user fees to repay the cost of construction over a period and to provide profit for the funding entity (Al-Homoud, et al, 2009; Gbadegesin and Aluko, 2014).

7.3.3 Public Funds

Taxes and tariffs are a source of financing that can be explored. Our finding in chapter five reveals that the Ghanaian public do not support any form of financing sanitation except for taxes or other public funds. Currently, many social intervention programme of the Government are funded annually using special levies and taxes that are aimed at financing projects that benefit the poor. These taxes include the National Health Insurance Levy. Taxes can be placed on homes above GHC200,000 and then these proceeds will be used to fund affordable rental housing units for the poor. Taxes can be placed on luxury vehicles and then used to fund road projects. Private vehicles in general could be taxed more heavily in order to discourage private ownership and usage of vehicles and encourage the use of mass transport systems. Tolls for private vehicles can be increased for peak periods to discourage usage of private vehicle on busy roads at peak periods.

7.3.4 External Sources

Finally, external sources can provide assistance for funding infrastructure. International organisations can be engaged to provide financing for urban infrastructure in the form or grants or concessionary loans. This financing option has been in active use for long and even actively used today to fund all manner of projects. The nation could still rely on these sources for financing. The only disadvantage with this source of financing is the fact that it may not be available at all times when it is required especially those that are offered on soft terms. It is therefore important to place more emphasis on the earlier options that are either locally sourced or from strictly commercial sources.

7.4 Project Identification and Pipelines for Low Income, lower and lower-Middle Income Housing

7.4.1 Slum Eradication Project- Joint State and Community Managed

Under the slum eradication project, the state will lead a process of building cheap rental dwelling units in the slums. These units will be built using a mix of cement and timber. Units will be constructed on community volunteer basis using labour at no cost. The central government will provide the initial funding either from donor funding or from its revenue. Slum communities should be made to own the project by being actively involved in the process of planning the "new settlements" and providing the labour for construction. The improvement of this project over the current state of slums will be the fact that the community will be planned. Planning these communities will provide an added advantage of allowing waste trucks to collect waste at homes so that waste will no longer have to be dumped at a central point in the community. Water pipes can be properly laid through the neighbourhood to ensure regular flow of portable water. Toilet and bath facilities can be built en suite or one for every few households. Communities will also have to be educated to adopt proper lifestyles that will ensure that success of the project.

The new units will be managed by committees set up by opinion leaders in the slum area who will collect rents on a monthly basis from the communities. Other committees can be set up to manage sanitation in the communities. Part of the rent will be paid to members of these committees. For purposes of monitoring, Social Security and National Insurance Trust (SSNIT) the State housing Corporation (SHC) and the

Tema Development Corporation (TDC) will be tasked with ensuring that the committees are collecting the rents and they will be in charge of managing the funds as well as paying the allowance of committee members. These organisations have provided rental units to the private sectors for so many years but have focused on the middle income bracket. From the data shown in chapter two, monthly rents can range from GHC30 ($7.5) for single units to GHC100 ($25) for two bedroom units. This will be so affordable for the urban low income earner. Affordability will partly be because there will be no rent advance required. At the

extreme, the governments' official maximum period for rent advance. Units will be strictly offered on rental basis and no private entity can own one of those units.

The advantages of this project type are in the low-cost of providing the units, improved sanitation and water supply and the community ownership which will ensure sustainability. In the long run, as incomes improve it is expected that residents of those communities will relocate to other housing units that corresponds to their new status.

Table 7.1 Role of Stakeholders

Stakeholder Group	Interest	Potential Impact	Potential Influence	Possible Role
Slum dwellers	1)Improved living conditions 2)Jobs for CommitteeMembers	May loose social connections because the people now live some distance apart.	Acceptance or otherwise of the initiative.	Contribute Volunteer Labour
Slum Lords or opinion leaders	1)Improved living conditions. 2)Jobs for Committee Members	May eventually lose some power as the community becomes more organised.	Support for or otherwise of the initiative	1. Can rally support for the project among slum dwellers. 2. Can provide useful insight into the operation of the committees.
Government	1)Improved living conditions for citizens 2) Job creation	Can better manage sanitation, collect taxes and enforce bye laws.	Support for and funding for the project	1. Provide building materials. 2. Management of dwelling units.

Source: Authors, 2017

7.4.2 Traditional Community Improvement Housing Project (TCIP) -Equity– State and Household Shared Equity Financed

There are many suburbs in Accra and Tema that can be considered as being dominated by natives. As mentioned previously, the housing conditions in these areas are not so different from those discussed in the previous subsections. Nonetheless, any intervention that is tailored to this category must be one that emphasises ownership. Lands in these areas are usually owned by or occupied by families who own them. The purpose of the

TCIHP is to provide these families new housing units on their own land. Under this project, the state is expected to provide the funding for constructing housing units on existing family lands. That is to say, the families will provide the land for the government to construct the housing units. Upon completion, the units will be valued and then the family will be attributed the portion of the value of the building that corresponds to the value of the land they offered. The other portion of the value will then be attributed to the government as equity stake in the housing unit. The families can then pay for this by mortgage over time

or by instalment. Alternatively, the family can offer other lands or properties to pay for the outstanding value. These additional lands can be used by the government to build units that will be offered wholly on commercial terms to other clients. For those who are not able to provide remaining value, government will continue to hold equity stake in their buildings. Government's role will be championed by quasi-state organisations including SSNIT, TDC and SHC. These agencies have provided rental units and sold units to residents of Accra and Tema for several decades but have done little to improve upon housing conditions of native residents. This is an opportunity to venture into that aspect.

The advantage of the TCIP will be to provide households improved living in their native town on flexible terms. As noted previously, native occupants are not simply low income earners, but it is common to find middle income natives living in these communities. This project will also preserve tradition and culture because the project will not displace the natives. They can therefore maintain family and social ties and so that they can continue to practice their tradition. Preserving their indigenous tradition is one thing the natives of the Greater Accra Region are particular about and so they will accept a project that will improve their living standards without adversely affecting their culture.

7.4.3 Middle Income Housing Projects (MIHP) - PPP Projects

These projects will be the largest of the three interventions. State institutions will collaborate with private investors to provide middle income housing units for purchase and rent. This category of residents is more likely to have the means to purchase housing units. Units constructed under this project will be offered on mortgage bases, outright purchase or rental basis. For lower middle income households, the rental units will better serve their needs. The MIHPs will be continuous. That means that they will be the main vehicle through which the annual national housing needs will be met. Moreover, the middle income bracket is expected to grow annually.

7.5 Project Identification and Pipelines for Infrastructure and Urban Services

7.5.1 Targeted LNG Credit Refund Fund (Clean Domestic Energy Project)

In 2010, the Energy Commission under the auspices of the Ministry of Energy embarked on a project to promote the use of LNG in domestic cooking and heating by distributing locally manufactured aluminium cylinder cans to lower income households. It is estimated that, the ministry distributed one million cans ranging from 3kg to 6.5kg cylinders to households. An impact assessment carried in 2015 by the Energy Commission found out that, many households had resorted back to the use of wood and/or charcoal for domestic cooking when they could no longer afford LNG to refill the empty cylinder cans. In that respect, we propose government subsidizes LNG to these people by setting up a fund called the Targeted LNG Credit Refund Fund. The Fund is then tasked to design criteria to register households who qualify to obtain subsidy under the programme. In addition, the Ministry of Energy can encourage the use of Solar Stoves by removing the import duty and Value Added Tax on solar stoves. The Ministry should also design campaign programmes to educate the indigenes on the health implications of using wood and charcoal as energy source for cooking and heating.

7.5.2 The Urban Mass Transit Project

Over the years, government has been exploring ways to reduce traffic congestion and the cost of urban transportation. Some are the control of transport fares, the establishment of the Metro Mass Transit and the establishment of the Greater Accra Passenger Transport Executive. The impact of these programmes is a mixed one. The control of fares creates a situation where transport fares remain stable for a while then followed by accumulated percentage increases. Aside providing free transport services to school children, the Metro Mass Transit company charges the same fare as the private transport operators.

Moreover, these interventions failed to correct the adverse externalities of traffic congestion and air pollution associated with urban transportation. We believe government should approach the situation in three ways. First, government should re-establish the Centre for Urban Transportation (a body established by the Centre for Urban Transportation Act, Act 799, 2010). The centre should among other things be tasked to ensure that the perennial congestion witnessed on urban roads is properly managed. The department of urban roads should partner the Centre for Urban Transportation to expand the roads in parts of the cities noted for congestion. Secondly, the government should regularize how urban transportation is conducted through a legislative instrument and appropriate enforce of the instrument in regulating private transport operators. The third project should be the Speed Lane Project. The urban transportation needs being considered are diverse and requires a multipronged solution. In that regard, we propose government consider the promotion of public passenger transportation, non-motorized transportation, and mass transit.

7.5.2.1 Project 1- Urban Public Passenger Transportation Subsidy Project

Currently, urban passenger transportation is provided by individual bus owners and the Metro Mass Transit Company – a government owned Bus Company. Because of lack of regulation, the quality of service provided by the private bus operators is substandard. The services are provided using rickety vans retrofitted with windows and seats. Their services are mostly patronized by the lower income bracket of urban dwellers who cannot afford cab services. In attempt to improve upon the service delivery, government established the Metro Mass Transit in 2003. The Metro Mass Transit managed to render quality services at cheaper fares at its initial stages of operations. Recently, the company is unable to operate viably due to huge operational losses from charging cheaper fares and mismanagement of available resources.

Because of the success rate at its initial stages of operations, we propose government concession the operation of the Metro Mass Transit Company to a private investor. This would afford government the opportunity to design and implement a well-targeted public transportation subsidy programme. Individuals who meet the criteria to obtain the public transportation subsidy are registered and issued with e-cards which they would use to pay fares. That way, government can effectively subsidize urban transportation at a cheaper cost. Also, because government would have to agree on the standards of operation with the private concessionaire, the quality of service is equally expected to improve marginally.

7.5.2.2 Project 2- Congestion Pricing/Speed lane Project

About 30% of urban commute is carried via public transportation and mass transit. As a result, a greater portion of urban commute is done through privately owned vehicles with a maximum load to capacity of 2 people. This situation results in inefficient use of limited road space, longer commute time and increased air pollution. According to the Ghana Health Service, there has been recorded an increase in the number of respiratory tract infections for 2015. Consequently, there is an exigent demand on government to correct the adverse externalities of increased traffic congestion and increased air pollution associated with motorized transportation. This is practically one of the ways to achieving Goals 11 and 13 of the Sustainable Development Goals.

In order to achieve maximum traffic decongestion and at the same time obtain funds to support the public transportation subsidy programme, we propose government introduce congestion charging. Even though congestion charging requires a huge amount of initial investment to acquire the technology and implement, we believe it is one of the ways of encouraging the use of public transportation. As more people abandon their cars to use public transportation, we expect a major traffic decongestion and reduction in air pollution. Not only would government obtain more funds to support the public transportation subsidy programme, but also to invest in new improving on the existing road infrastructure. Road users can be charged a fee for using private vehicles on busy roads at times identified as peak hours.

Congestion pricing can also be implemented

through the speed lane project. The speed lane project will involve special lanes that will attract fees and will be without congestion. This project will be a PPP where the government would engage private sector in to construct the road and then obtain the right to collect fees on that road for an agreed upon number of years. Vehicles can be programmed with some form of e-card from which the fee will be charged on their private account whenever the use the speed lanes. The disadvantage of this method is in that it requires a huge initial capital which may not be available to the government and may be difficult to find a private investor.

7.5.2.3 Project 3- Non-Motorized Transportation (NMT)

NMT, which comprises of walking and cycling, is often under recognized in transportation planning. Despite the fact that NMT is the cheapest and the most sustainable means of urban transportation, infrastructure needs for pedestrian walking and cycling are mostly sacrificed to increase the flow of vehicles. Because a greater portion of urban commute by lower income earners is achieved by walking and the use of bicycles, we propose government invest heavily in the provision of NMT infrastructure like pedestrian walkways and bicycle lanes. This would reduce air pollution drastically. We also propose government eliminate import taxes and VAT associated with the importation of bicycle and bicycle accessories into the country.

7.5.2.4 Project 4- Rail Transport Revival Project

The existing train system has grinded to a halt due to lack of investment and mismanagement by the Ghana Railway Authority. We propose government invite private investors to build and operate light railway systems to complement the services of the Metro Mass Transit. Government can achieve this objective by providing tax waivers to investors considering investing in the railway sector. The tax waivers can also be in a form of elimination of taxes on major inputs for building and operating a railway system. The rail transport is the starting point of Ghana's transformational agenda going forward and represents a financially viable investment avenue. Wholesale economic activity will pick up very quickly if the ten regions of this country are networked by train.

It will facilitate easy movement of goods and services and facilitates the mobility of labour and other factors of production.

7.6 Project Identification and Pipelines for Resilient and Green Urban Development Projects

Housing production for both rental and owner occupation is largely driven by individual households and private estate development companies. In fact, a greater share of housing supply in both cities is carried out by households through the incremental building process. As already noted, the vast majority of houses are constructed with mainly cement-based products often in areas with little or no infrastructure. The concept of resilient and green urban development is yet to be embraced in any meaningful way in both cities. There are currently no known green housing development projects in both Accra and Tema except for a few middle and upper income earners who have installed solar or rainwater harvesting systems in their private residences. In an interview, the Chief Executive Officer of the Ghana Green Building Council confirmed by indicating no knowledge of any housing project, either at the planning or implementation stages that incorporate green features. Furthermore, the AMA and TMA have no requirements in their respective building codes that mandate or incentivize the adoption of resilient and green developments.

Notwithstanding the lack of activity in green housing development, opportunities abound to develop, adopt and promote several locally-sourced alternative building materials that are greener and sustainable. A questionnaire was sent to the GHGBC to indicate a list of alternative but green building materials that can be adopted to reduce the use of cement-based materials in the construction of houses. The responses, which are summarized in the table below, show that there are readily available alternatives for all the major building components. The major challenge is in getting the consumer to accept these alternatives. The Ghanaian consumer has become accustomed to the traditional building materials and it would

require a lot of reorientation to get them to adopt these alternative materials. In addition, private estate developers are unwilling to take the risk of using these alternatives in their projects for fear of lack patronage. The lack of interest in pozzolana even though the BRRI has demonstrated its advantages in terms of cost

saving is a clear example. A recommended approach to spur activity in green housing development projects is to undertake a pilot project to demonstrate the prospects these materials hold in the move towards a resilient and green urban development.

Table 7.2: Some Locally-sourced Alternative Green Building Materials

Building Component	Alternative Material
Floor	Timber, Bamboo, insulated Gypsum/Cement Board Landcrete, Stabilised/rammed earth, Bricks, Stone, Polystyrene Insulated Panels.
Wall	Rammed earth (adobe), Wood, Bamboo, Epoxy, Vinyl
Roof	Clay tiles, Bamboo, PVC Thermoplastic Roofing, Solar Blocks, Insulated Aluminium/Metal Roofing System using Polystyrene.

Source: Survey, 2016

There are also a few innovative ideas being spearheaded by local small businesses that have tremendous potential in promoting a more sustainable and green urban environment. One such idea is the processing of coconut waste, which often litters the streets of both cities, into peat and fibre. The peat is used as a medium for growing vegetables and flowers especially in green houses while the fibre is made into fibre boards for industrial applications. The development of the fibre board is still at an early stage but samples developed so far show a lot of promise. In particular, the boards can be used in the construction of green affordable housing for the lower middle income segment of the population. It must be noted that coconut is easily grown along the coastal areas of Ghana and is consumed all around the two cities. It is thus very common to observe several stands of coconut sellers along well trafficked roads. Figures 7.2 and 7.3 show a heap of coconut waste in Accra and an actual sample of a fibre board produced by one of the small businesses located in Tema. It is suggested that a programme be designed that seeks to identify all such ideas and provide the needed technical and financial support to make them into viable businesses and to bring to market such alternative materials.

In addition to projects that target new housing construction, there are opportunities to design programmes that seek to reduce the carbon footprint of existing houses. For instance, programmes can be designed to provide support to homeowners to install rainwater harvesting and solar systems. Currently, the Government of Ghana, through the Energy Commission, has embarked on a programme to encourage the installation of solar panels in residential facilities. The Rooftop Solar Photovoltaic (PV) Programme, which is aimed at providing about 200MW peak load relief on the national grid through solar PV technology, has already begun the process of facilitating the installation of about 20,000 rooftop solar PV systems in residential facilities (homes) under a Capital Subsidy Scheme in 2016. The programme grants a capital subsidy to beneficiaries to install solar system with a capacity of up to 500 Watts. The subsidy comes in two forms: Cash payment for solar panels component of the solar PV system; or the supply of actual solar panels after the beneficiary has purchased and installed the requisite Balance of System (BoS) components such as inverter, batteries, charge controllers, etc.

The existing programme can be expanded to provide support to more households. Innovative financing mechanisms such as the proposed green loans programme can provide a sustainable source of funding. It is recommended that a rainwater harvesting systems installation be created to facilitate the widespread installation of these systems across both cities. There are several benefits that such a programme will bring. First, it would provide a reliable alternative source of water at possibly cheaper cost than current sources.

Secondly, a mass installation of these systems will significantly reduce the amount of water run-off and thereby lessen the risk of flooding, which is a major hazard the city of Accra especially faces. Thirdly, it would reduce the demand for water from the public mains and relieve the need for more public investments into new water systems. It is important to stress that in all of these programmes, some form of public-private partnership must be used instead of a fully owned and operated public programme.

Figure 7.2: Photo showing a pile of coconut waste near the city centre in Accra

Source: Myjoyonline.com

Figure 7.3 A sample coconut fibre board

Source: Authors, 2017

Chapter 8

Conclusions

Ghana's population growth is remarkable but is also characterised by rapid urbanisation. At the hub of this urbanisation is Accra and Tema which are functionally and geographically integrated and have similar characteristics (GLSS6, 2014) and for the purpose of development planning in Ghana, the two cities are part of the Greater Accra Metropolitan Area (GAMA) which comprises the Accra Metropolis, Tema Metropolis, and six other municipalities (i.e. Ga South, Ga East, Ga West, Adenta, Ashaiman and LedzokukuKrowor). The large number of people living in the region has come with it social issues that are generally associated with urbanization. These issues include housing, social and economic infrastructure and sanitation.

The last GLSS showed that more than 63.9% of residents in and around Accra and Tema live in either single rooms or two rooms in compound houses (with at least one of the rooms as sleeping rooms. The 2000 housing and population census in Ghana showed that there were about 3.88 million dwelling units in Ghana with only about half being classified as houses. The remainder is poor quality structures including mud houses, kiosks, and tents, attachments to shops and offices and containers located in urban areas, mostly in the Greater Accra Region. The 2010 housing and population census also indicated that 50.9% of Ghana's population lives in urban areas. Greater Accra region is the most urbanized region at 90.5% with Accra and Tema both in the greater Accra region being the most populated areas. Furthermore the proportion of makeshift dwelling units is largest in Greater Accra at 6.2% and less than 1% in other regions. The GLSS6 indicates that 3.6% of households in Accra live in impoverished housing units; a figure which is significantly higher for other urban areas.

The foregoing strongly suggests that while there is an overall shortage of housing and particularly so in the Greater Accra, the situation is rather acute for low income earners. Though as a solution to this problem the real estate firms have been playing their role, urban households often have informal and fluctuating income sources. As a result of this most households prefer to construct their

own housing units through private savings and informal sources of finances over a period of 5 to 15 years (95.5% of homeowners in our sample, Figure 18). This explains why there are many uncompleted buildings in many new residential areas in and around Accra and Tema.

The resulting huge infrastructural gap, urban services, healthcare delivery cannot be unexpected together with numerous sanitations challenges. Solving these challenges calls for a concerted and integrated approached involving macro-level stability to drive down interest rates, extend maturity tenure of lending, reduce inflation to preserve income level of urban dwellers, development of appropriate financing instrument supported by appropriate and enabling regulatory framework.

Moreover, concerns over unsustainable warming of the planet have necessitated global efforts to cut green house gas emission and transition towards a green economy. Reducing the carbon footprint of buildings remains central to these efforts. The housing industry in Ghana is yet to embrace global trends in sustainable and green practices. This is evidenced by the over-reliance on building materials that contribute the most to CO_2 emissions such as cement. Both the 2010 population and housing census and the 2014 Ghana Living Standards Survey indicate that a vast majority of houses in Accra and Tema are constructed with predominantly cement-based materials. There are three aspects of this state of affairs that are worthy of note.

First, there is general lack of awareness on the need to adopt green building practices and an unwillingness of both households and developers to use alternative materials that are likely to promote sustainable and green housing developments. Secondly, the fact that the initial cost of houses incorporating green features is often higher than conventional buildings presents a major barrier for the majority of households as they are very likely to be price-sensitive. Thirdly, there are currently no incentives to switch to green developments neither are there specific requirements in the building code to mandate such developments.

To stimulate activity in green housing development projects, a pilot project should be set up to demonstrate the prospects and benefits of alternative materials that meet the requirements for green developments. It is further suggested that a programme be designed that seeks to identify innovative ideas that have the potential to advance the quest for greener communities and provide the needed technical and financial support to make them into viable businesses. Moreover, existing programmes such as the Government of Ghana sponsored Rooftop Solar Photovoltaic (PV) Programme should be expanded to provide support to more households. Innovative financing mechanisms such as the proposed green loans programme can provide a sustainable source of funding. It is further recommended that a rainwater harvesting systems installation be created to facilitate the widespread installation of these systems across both cities.

The housing sector in Ghana faces several challenges that hamper the delivery of affordable housing on a scale that meets the needs of lower middle income households. Construction costs have increased rapidly over the past two decades and have averaged at rates higher than the rise in general price levels mainly due to the reliance on imported building materials. Another challenge is the high cost of urban land and the lack of basic infrastructure

for lands at the periphery of the cities. As a result, most of the new housing developments take place at the periphery at a great cost to the environment and with limited accessibility to work areas and the central business district. The lack of access to long-term and cheaper funds has been highlighted as major bottleneck for the delivery and purchase of housing units. Several approaches have been discussed that seek to proffer solutions for reducing construction costs, lowering the cost of land and the cost of finance.

The study also examined the opportunities for launching new instruments for financing low carbon and resilient developments and recommended several instruments including a green loans programme, research and development fund to support the development and promotion of sustainable building materials and construction practices among others. To improve the efficiency and effectiveness of financial and technical support, it is recommended that technical support to the cities must enhance their capacity to employ land use regulatory powers to provide incentives for developing resilient and green housing and infrastructure. Furthermore, the study reveals a number of areas international development agencies can provide support to the financial sector and notes the financing and capacity building opportunities that exist in both cities.

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