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Thesis

Inhabitants' perspectives on the adequacy of the compound house in Ayigya, Kumasi, Ghana: Towards a spatial and technical improvement and an enabling policy environment as a low income housing option

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UMD 6

Summary

This study started with the assumption that the compound house, a vernacular housing form in Ghana, could be an adequate low income housing alternative.

Compound houses have accommodated the low income population in Ghana, where the population growth, limited housing production, lack of basic facilities, services and infrastructure and the deterioration of the existing housing have left basic shelter out of the reach of the most low income households.

Compound houses are low cost, easy to build, thus affordable. They have a pure architectural form and a clear space hierarchy thus they are adaptable. They allow multi-habitation encouraging communal life and providing security. On the other hand, they are large structures and building one is still costly for a low income household. They are overcrowded due to the densification, and their shared services and facilities are overloaded.

Current housing policy in Ghana promotes single family houses, instead of compounds although they are expensive to build and they can house less people. Ignoring compound houses adds up to the housing shortage in the country, affecting mostly low income households.

Compounds have potentials that make them worth reconsidering. They can be an housing alternative for the low income, but promoting them as a low income housing option brings questions of adequacy. They have potentials to be reconsidered, but they have problems as well. Since the Habitat Agenda (1996) states that access to a safe and healthy shelter and basic services are closely related to general well-being of the people, it is vital to assess the adequacy of the compound houses. Besides, discussing the adequacy of the compound houses could present insights to improve them and describe the policy environment to enable their provision.

Regarding the contextual aspect of adequacy, it was essential to evaluate the compound house according to the perspectives of its inhabitants', since they had the most accurate vision on it. On the other hand, adequate shelter definition of the Habitat Agenda (1996) and the criteria of the right to adequate housing by UNHCHR (1991) provided the ideal framework to assess the adequacy of the compound house. In this framework, an objective discussion on the adequacy of the compound houses was considered to be the most viable way to present them as an adequate low income housing option.

Therefore the primary research question was:

How can the housing perceptions, aspirations and needs of the compound house inhabitants be translated into:

> *-Spatial and technical improvements to make the compound house an adequate low income housing option?*
>
> *-A policy environment to enable the provision of the compound house as an adequate low-income housing option?*

The research addressing this question was a case study, exploring the current situation of 'the compound house' at a specific neighbourhood in Kumasi, Ghana: Ayigya. Two household surveys were conducted in Ayigya; the general household survey gathered basic socio-economic data and general data on housing and household characteristics, while the compound specific household survey was designed to get inhabitants' views regarding the criteria of the right to adequate housing. In-depth interviews were conducted to the key informants from academia, the local government and to the traditional authority. Observations were documented by a transect walk.

Research highlighted that the compound houses in Ayigya were generally inadequate. They were rather satisfactory on some criteria of the right to adequate housing, but they were quite problematic on others. The research mostly verified and consolidated the findings of the previous studies in Kumasi. It also described the instances contradicting them, contributing to the on-going discussion on promoting compound houses as an urban low income housing form.

Findings of the research would probably apply not only to Ayigya, but to most of the compound house neighbourhoods in Ghana, though severity of the conditions might differ. The validity of this research depends on its ability to inspire new studies and to give insights for the actual physical improvements and policy implementations, since it is basically an assessment of the existing situation of a housing form.

It is hoped that, revealing the inhabitants' perspectives on compound houses would contribute to a change in the government approach, with innovative solutions to the housing problem of the low income, respecting existing forms of housing provision, local architecture and community participation.

Keywords

Ghana, Kumasi, Compound House, Adequate Housing, Enabling Strategies

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Abbreviations

CBO-Community-Based Organization

GSS-Global Strategy for Shelter

ICESCR- International Covenant on Economic, Social and Cultural Rights

IHS-Institute for Housing and Urban Development Studies

KMA-Kumasi Metropolitan Assembly

KNUST-Kwame Nkrumah University of Science and Technology

KVIP-Kumasi Ventilated Improved Pit

LPG- Liquefied Petroleum Gas

NGO-Non-Governmental Organization

UNHCHR-United Nations High Commissioner for Human Rights

WHO-World Health Organization

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Chapter 1: Introduction

1.1 Background

Urbanization is a common phenomenon taking place all over the world, but it is highest in Africa with a 3.5% rate (RICS 2006). Providing housing and related infrastructure for the growing urban population, especially for the low-income is one of the challenges faced by governments of Sub-Saharan Africa (Yeboah 2005). Ghana is one of the developing countries in Sub-Saharan Africa, where urban growth has gone beyond the capacity to provide adequate shelter for most of its population. Formal and informal housing sector together are not capable to produce more than 20% of the yearly housing need. The deterioration of the existing houses due to lack of consistent maintenance also adds up to the housing problem. Ghana produces almost one fifth of the annual approximate housing need, is not able to maintain the housing stock and has a 300,000 unit backlog to reduce congestion in the existing units. Under-production of housing causes overcrowding, over loading of the already scarce services and use of non-habitable units. The part of the population mostly affected by the problem is the urban poor, who usually occupy compound houses in Ghanaian cities (Konadu-Agyemang 2001; Afram & Korboe 2009).

The places where houses of the poor cluster are challenged economically and they suffer from unemployment, crime, deteriorated housing and poor health. Meanwhile there is a strong correlation between improved housing conditions and poverty reduction. Adequate housing is one of the effective ways to alleviate poverty, since a house is the most expensive item in a household's expenditure. Housing improvement results in improved wellbeing, since access to basic social services such as water and sanitation would lead to improvements in the health, hygiene, livelihoods, psychological wellbeing and social interaction of the household members. The need to provide adequate, suitable and equitable housing is a major priority of every government. Yet, housing problem is complex and pressing that it is a challenge for governments to provide adequate housing for all its citizens. Half of the population in Ghana live in poor housing, particularly in urban areas in unsanitary conditions where they lack access to basic facilities like; toilets, bathroom, kitchen and refuse facilities (UN HABITAT 2010).

Habitat Agenda states that, mostly in developing countries, more than one billion human beings still lack adequate shelter and are living in unacceptable conditions of poverty. Adequate shelter, as described in Habitat Agenda, is 'more than a roof over one's head', meaning that it should provide "adequate privacy and space, physical accessibility, adequate security, tenure security, constructional stability and durability, adequate lighting, heating and ventilation, adequate basic infrastructure, proper quality of environment and health-related factors, and an accessible location concerning work and basic facilities, all at an affordable cost" (UN-HABITAT 1996, p.22). Habitat Agenda further states that the concept of adequacy should be specified with the people concerned, considering the possible gradual development, noting adequacy usually differs according to countries,

since it includes specific cultural, social, environmental and economic dimensions (UN-HABITAT 1996).

1.2 Rationale

Compound house, prevalent housing form occupied by the urban poor in Ghana is basically a courtyard house. It consists of rooms opening to a central courtyard, and it is archeologically proved to be the normative housing form dating back to antiquity (Afram & Korboe 2009). Literature on compound houses in Ghana, suggest that they are advantageous for the urban poor for various reasons. First of all, compound houses are easy to build for they do not require high technology and skilled craftsmanship due to their simple form. Simplicity of construction and shared facilities make compound houses low-cost, thus affordable for the poor. Multi-habitation, being an important feature of the compound house, enables accommodation of a mix of owners, relatives and renters in the compound, encouraging communal life and mutual assistance (Tipple 1999). For Sinai (2001) it is very common that compounds house home-based businesses, which often require the extension of the house. For Afram and Korboe (2009) simplicity of the compound's form makes extensions possible and easy to implement.

As a result of various factors, there is a continuous densification and extension activity in compound houses. Densification of the compounds contributes to the deterioration in quality. Increase in the density without decrease in the room occupancy rates has the potential danger of causing incidences of disease outbreaks such as cholera. Shared use of facilities is often problematic since it causes overloading and forces inhabitants to use public facilities. Communal life and overcrowding in the compounds create problems of privacy (RICS 2006).

Although compound houses continue to accommodate the majority of the urban poor, standard layout legislations and planning regulations obstruct grid layout pattern of compound houses with paths and lanes in between the houses. These legislations to obstruct the production of compounds facilitate the building of villa style houses. It is also important to note that, according to RICS paper (2006) in Kumasi, the second largest city of Ghana, and the capital of Ashanti region, there is a tendency in the community to prefer western style villas that represent modernity to the compound houses which are associated with the tradition.

Despite its problems arising from the general housing situation in the country, but not inherent to its architectural qualities; essential features of its architectural form, life style it encourages and its building process has potentials to be improved to provide adequate housing for the low-income population in Ghana (Afram & Korboe 2009). Therefore, studying the relevance of the compound house as an adequate housing might contribute to improve it spatially and technically and define the policy environment to enable its provision as a low-income housing option.

Adequacy of the compound house, in this study is assessed in terms of adequate shelter definition of Habitat Agenda and criteria of the right to adequate housing.

Adequate shelter definition of the Agenda being already mentioned above, it is important to note the criteria of the right to adequate housing.

1.3 Right to adequate housing

The right to adequate housing is an article of the Covenant of United Nations High Commissioner for Human Rights (UNHCHR 1991) in which the concept of adequacy is particularly stressed with its social economic, cultural, climatic and ecological determinants in relation to right to housing. Certain aspects of the right to adequate housing, identified by the committee are stated as follows:

Legal security of tenure; signifies protection against eviction, harassment and other possible threats.

Availability of services, materials, facilities and infrastructure providing continuous access to safe drinking water, energy for cooking, heating and lighting, sanitation and washing facilities, means of food storage, refuse disposal, site drainage and emergency services.

Affordability assuring that the costs of housing should not threaten or compromise the attainment and satisfaction of other basic needs. Housing subsidies and, housing finance options should be provided by state parties for those unable to obtain affordable housing.

Habitability meaning that adequate housing should provide adequate space for its inhabitants, and protection from health threats, structural hazards, and disease vectors.

Accessibility meaning, adequate housing should be accessible for those who need it, especially for the disadvantaged groups.

Location of the adequate housing should provide access to employment opportunities, health-care facilities, schools, and other social services. Adequate housing should not be built on polluted sites or in close proximity to pollution sources that threaten the right to health of the inhabitants.

Cultural adequacy should ensure that the way housing is constructed, the building materials used and the policies supporting these must express the cultural identity and diversity of housing. Activities aimed to develop or modernize housing should consider the cultural dimensions of housing (UNHCHR 1991).

1.4 Research Area

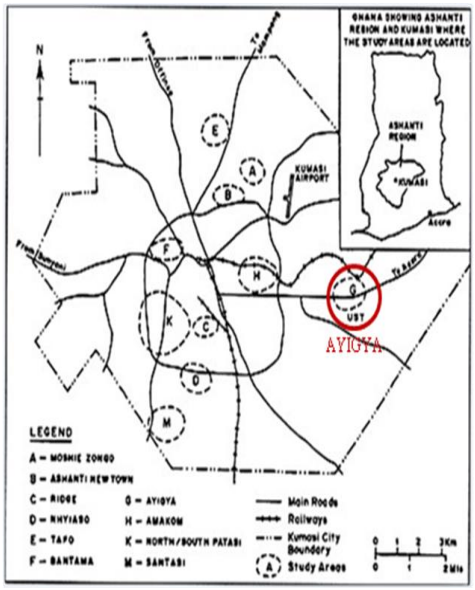
The research was carried on in Ayigya, Kumasi, Ghana. Ayigya is a suburb of Kumasi, which is the second largest city of Ghana, and the capital of the Ashanti region. Population of Kumasi was 1,170,270 in the 2000 Population Census, but it was projected to 1,610,867 in 2006, and to 1,889,934 for the year 2009 (Kumasi Metropolitan Assembly 2006) (Figure 1, p.4).

Ayigya is located along the Accra-Kumasi highway six kilometres from the Kumasi city centre, north from the campus of the Kwame Nkrumah University of Science and Technology (KNUST). Ayigya used to be a village outside the city, but with the urban sprawl it became a part of the expanding city. Ayigya contained a Zongo[1] part where non-Akans[2] are housed (Tipple 1982). Ayigya has a population around 30,000 on an area of 50 hectares (Nyarko, Odai & Fosuhene 2006) (Figure 2).

Figure 1: Map of Ghana

Source: Adapted from nextghana.com 2009

Figure 2: Map of Kumasi



Source: Adapted from Asiedu 1999

1.5 Research objective

The main objective of this study is to define a spatial and technical improvement process for the compound house as to satisfy the criteria of the right to adequate housing and describe the policy environment to enable its provision as an adequate housing option. Defining a spatial and technical improvement process for the compound house and describing the policy environment to enable its provision as an adequate low income housing option requires the assessment of the adequacy of the compound. Therefore; adequate shelter definition of the Habitat Agenda (1996) and criteria of the right to adequate housing by UNHCHR (1991) are used as a framework to assess the adequacy of the compound house regarding perceptions, aspirations and needs of its inhabitants.

[1] Zongo is defined as an area in Kumasi occupied by northerner muslims who migrated to the city (Tipple, 1987).

[2] Ashanti tribe, which is one of the biggest and powerful tribes in Ashanti region, where Kumasi is the capital belong to Akan group, who speak the Twi language (Van Donkelaar & Van der Laan 1994).

Considering the contextual aspect of adequacy, the compound house is to be evaluated according to the perceptions, aspirations and needs of its inhabitants. Revealing inhabitant's perspectives on the problems and potentials of the compound house might provide first hand information on how to improve it. This is especially crucial, since building the compound house can be seen as a self-help building activity which is incremental not only due to financial limitations of the owners, but also for the need to adjust it for the new or existing inhabitants in time. Studying the adequacy of the compound house, as a housing option for the low-income might help to describe the ways by which this self-help activity can be aided and improved spatially, technically and in terms of policy making.

On a theoretical level this study is aimed to achieve a local definition of adequate housing, which might be interpreted for any human settlement, and practically it is to provide information on how to improve a local architectural house form in Ghana, spatially and technically. It is aimed to describe the policy environment which includes the provision as well as improvement of compound houses as an adequate low-income housing option. Revealing the inhabitants perspectives on compound houses, the hope is that, this study might contribute to a change in the government approach as to search innovative solutions to the housing problem of the low income, respecting already existing forms of housing provision, local architecture and community participation.

1.6 Primary research question

The main research question addressed in the study aims to define the process by which the housing perceptions, aspirations and needs of the compound house inhabitants in Ayigya, Kumasi, can be used to improve the compound spatially and technically. In doing so it is aimed to describe the policy environment to enable its provision as an adequate low-income housing alternative. This requires the revelation of the housing perceptions, aspirations, and needs of the compound house inhabitants in Ayigya, Kumasi. The study of the compound house with respect to criteria on right to adequate housing, thus; legal security of tenure, availability of services, materials, facilities and infrastructure, affordability, habitability, accessibility, location and cultural adequacy is necessary to discuss its relevance as an adequate housing option. Finally, the evaluation of the perspectives of the inhabitants is needed to identify the possible actions and strategies to improve the design, construction and services of the compound house and to define the policy environment in which this improvement process might be encouraged, implemented and sustained.

Therefore, the primary research question is:

How can the housing perceptions, aspirations and needs of the compound house inhabitants be translated into:

-Spatial and technical improvements to make the compound house an adequate low income housing option?

-A policy environment to enable the provision of the compound house as an adequate low-income housing option?

1.7 Thesis structure

The core of this study is a qualitative household survey on a community (neighbourhood) level, linked to the compound house with reference to aspects of the right to adequate housing. Using the detailed household survey, it is aimed to get perceptions, aspirations and needs of the inhabitants on the compound to examine its capacity to satisfy the key issues of right to adequate housing.

Literature review, inhabitants' perspectives, key informants' views and author's personal observations on the compound house is evaluated through the framework of criteria of the right to adequate housing.

The study is organised in five parts. Chapter 1, 'introduction' is expected to give a definition of the problem, the scope of the research and aim of the study.

Chapter 2, 'literature review/theory' provides background information for the study defining the context. After describing housing situation in the city of Kumasi, and policy environment in Ghana, it focuses on compound houses aiming a broad description of its facilities, potentials and problems. Key concepts of 'adequate housing' and 'enabling strategies' are introduced in this chapter which is finalised with the conceptual framework of the research. Conceptual framework presents the major concepts in the study, guiding the course of the research.

Chapter 3, 'research methodology' is a detailed description of design and implementation of the research. It introduces research instruments and means to provide research validity and reliability, stating the expected outcome and limitations.

Chapter 4: 'research results and analysis' discusses the findings of the case study with respect to literature review.

Chapter 5: 'conclusions and recommendations' conclude answering the research questions, presenting strengths, weaknesses and recommendations for the future research.

Chapter 2: Literature review / theory

Significant concepts which form the background of the study are highlighted in the literature review. In order to assess the adequacy of the compound houses objectively, it is vital to comprehend the context they are in. Housing situation in Kumasi and the policy environment in Ghana describe physical and, legal and regulatory context in which the compound houses are built. Detailed description of the compound houses in the literature, with their facilities, potentials and problems is extremely important to compare and contrast their situation in theory and on site. Concepts of adequate housing and enabling strategies are elaborated since they form the guidelines to define spatial and technical improvement for the compounds and to describe the policy environment which enables their provision as an adequate low income housing option. Finally the conceptual framework is presented.

2.1 Housing situation in Kumasi

In a typical Ghanaian city, outside the mixed use city centre, poorly serviced neighbourhoods of single storey compound houses, together with private elite homes are located alongside the grid-iron layout settlements of public built estates. As a term 'compound house' is used to address a vernacular housing type in Ghana which is consisted of series of rooms opening to a central courtyard. Single storey compound houses are occupied by the poorest section of the urban population (Afram & Korboe 2009).

In Kumasi, rented multi-storey compound houses are located mostly in the city centre, in a formally planned grid iron layout. Inhabitants of these multi-storey compound houses are usually tenants, paying rent to owners who are not occupying the same house. Meanwhile in the former villages which have become a part of the expanding city with the urban sprawl, mostly single storey compound houses are located. In these former villages which are controlled by local chiefs, unauthorized houses, that are not built according to regulations form the general housing pattern of these mostly unplanned areas (Van Donkelaar & Van der Laan 1994). Single storey compound houses accommodate half of the population in Kumasi, while the multi storey compound houses accommodate another 25% of the population. Other one quarter of the city's population are housed in villa style houses, government-built housing or employer housing (Tipple 1987; Sinai 2001).

There are few multi storey compound houses outside the city centre. In a typical neighbourhood outside the city centre, the layout of houses does not follow a pattern. Furthermore, the houses might be situated on land originally reserved for other uses. This lack of development control causes invasion of open spaces and land for public buildings by unauthorized residential buildings. Houses are built in places where there should be roads, schools, refuse damps, and they are built too close together that some of them can only be accessed by small paths (Van Donkelaar & Van der Laan 1994; RICS 2006).

Predominant housing form outside the city centre is the single storey compound house. Compound houses accommodate a mix of owners, rent paying tenants and rent-free tenants who are the members of the owners' extended family, thus multi-habitation is a characteristic feature of the compound houses. Multi-habitation of the compound mostly results in the sharing of facilities, where most compound houses lacked basic services and facilities. These three tenure groups in compound houses usually have similar housing conditions, where they share the facilities like kitchen and bathroom, and occupy similar space, majority of them occupying just one room (Sinai, 2002; Van Donkelaar & Van der Laan 1994).

Traditional inheritance patterns in Ashanti culture have a matrilineal family system, which excludes a man's own children from his inheritance, passing the property to his sister's sons. Legislation in 1985, gave the spouse and children of a deceased homeowner inheritance rights and legal control of the house, but traditional and official inheritance laws act together in practise. This inheritance system results in the multiple owners for majority of the houses in Kumasi. When the original owner of a house dies, the extended family has the communal ownership of the house and they decide who would live there. This includes the households who had been in the house when the original owner was alive, but it is not limited to them. Selling a house is a complex process with the multiple ownership and interlineal relationships, therefore there are very few houses for sale in Kumasi and a household usually needs to build a house to own one, which can be difficult for lack of a housing finance system (Sinai 2002).

Another important feature of a home ownership in Ashanti culture that affects housing conditions is that owners have obligations to members of their extended family. It is not culturally acceptable for a house owner to reject requests of the extended family to have a room in the house, so that it is very common to have the members of the extended family as rent-free occupants in the house (Sinai 2002).

In Kumasi, where 80% of houses are built by private initiative, there is a shortage of housing; therefore city of Kumasi is unable to provide affordable housing for the majority of its population. Furthermore majority of the households (almost 75%) in Kumasi occupy just one room. High population density, inadequate or non-existent services and poor maintenance of the existing houses all contribute to the severity of housing problem in Kumasi. Majority of the households (57.4 %) are home owners in Ghana. 22.1% of the households are renters, while 19.5 % has rent free accommodation. In Ashanti Region, where Kumasi is the capital, owners constitute the 47.6 %, renters 26.2 and rent free accommodation 21.6% of the total tenure. Customary tenure systems, controlled by the traditional chiefs limit the availability and access to urban land for low income groups (Tipple 1987; Van Donkelaar & Van der Laan 1994).

The field for this study, Ayigya is a single storey compound house neighbourhood which is a typical example of what Tipple (1987) in his book *The development of housing policy in Kumasi, Ghana, 1901 to 1981: with an analysis of the current*

housing stock identifies as the indigenous sector[3]. Indigenous sector is characterised by single storey compound houses, although in some areas other forms of housing also exist. Some areas in this sector, especially more central ones are built in accordance with the statutory layout plans, but large areas are built without any formal plan. Most of the indigenous sector urban areas have grown around former villages controlled by local chiefs. This control by traditional customary systems is often carefully implemented since hiring a surveyor to mark out a plan is a common practise. Meanwhile houses in the sector usually do not fit into town planning department layouts, and are unauthorised, even though they are not squatters since the title owned by the land holder is valid in customary law (Tipple 1987).

Traditional control of the land by chiefs, in former villages like Ayigya, prevents squatting. But, lack of squatting as a housing option for the low income in Ghana, unlike most developing countries, results in densification of the existing housing stock which is already subject to deterioration (Tipple & Korboe 1998; Tipple 1999).

General picture of the housing situation in Kumasi is partly related to the poverty in the city. Therefore, Devas and Korboe (2000) in the article *City governance and poverty: the case of Kumasi*, in which they discuss the relation between poverty and governance in the city of Kumasi, define indicators of poverty related to housing as growing numbers of homeless; increased room occupancy rates; and growing numbers of refugees sleeping in open spaces. Ethnic Ashanthenes[4] living in old, dilapidated traditional housing are identified as particularly poor and vulnerable (Devas & Korboe 2000)

Services in Kumasi

Unfortunately, the situation of services that Van Donkelaar & Van der Laan (1994) had mentioned in their study *The Housing Situation in Kumasi: A Case Study of Atonsu/ Agogo* is pretty much relevant for today's Kumasi. There are puddles on most of the roads, constantly filled with water, which are breeding places for mosquitoes. Roads are washed away by rain and they function as drains since there is no proper drainage system, which caused erosion and stench. A lot of stalls located along the roads, narrow the roads. Most houses have electricity although the supply is irregular. A large proportion of the houses still do not have a piped water system and sanitation is very poor. In some areas in Kumasi, one tap is shared by 24 households, and one toilet is shared by 31 households (Van Donkelaar & Van der Laan 1994).

When water supply system is considered, it is again unfortunate to note that Tipple's findings are still valid for most parts of the city. It is estimated that more than half of the houses in Kumasi do not have a connection to a piped water

[3] In Tipple (1987), in order to describe the housing stock in the large city, Kumasi is divided into four sectors, namely; the high cost, the tenement, the indigenous and the government sectors.

[4] Member of Ashanti tribe

system. Households, which do not have a connection to a piped water system, rely on public taps and other supplies which are less hygienic. A significant problem with the water supply is that water pipes are not properly maintained. Main pipes are often damaged because of erosion on the roads. The pipes of private connections are visible on the surface of paths and roads. This situation is crucial since water supply is the most important service in a city, where provision of a piped system can be a major improvement in health and a reduction in mortality (Tipple 1987).

2.2 The policy environment in Ghana

The housing situation in Kumasi is the reflection of the housing policy and economy in Ghana. According to Konadu-Agyemang (2001), poor economy of the country, unrealistic rent control, outdated building codes, high cost and limited supply of building materials and building lots, lack of an efficient housing finance system, incomes which stayed low relative to inflation rates, have all contributed to the overall housing situation of the country. In Ghana; the population growth, limited housing production, lack of basic facilities, services and infrastructure in the existing housing stock and deterioration of the existing housing due to lack of consistent maintenance program leave basic shelter out of the reach of most low and lower middle-income households, while making it difficult to be affordable even for the upper income groups (Konadu-Agyemang 2001)

Unrealistic rent control exploited by Ghanaian government for decades restricted housing production, since income from rents were not sufficient enough to cover building costs. It also resulted in withdrawal of houses from the rental market. Furthermore low maintenance of the houses due to insufficient rental incomes had a negative effect on the quality of the existing housing stock. Rent control, as a result restrained both the quantity and the quality of the housing stock (Konadu-Agyemang 2001; Tipple & Korboe 1998).

Main legislations to regulate land uses in cities in Ghana, Town and Country Planning and Municipal Council Ordinances, based on the British system from 1932 are outdated and unrealistic. These legislations define planning schemes, layouts, plot sizes and zoning, as well as building regulations and procedures for building permits and the building materials to be used for housing construction. These high standard regulations and the shortage and high price of main building materials restrain housing production. The insistence on the use of imported building materials, minimum plot size and coverage's increase the housing prices beyond reach of even rather better off groups. The fact that building legislations promoted single-family self contained units also restricted low-cost multi-habitation contributing to the decreasing affordability of housing (Konadu-Agyemang 2001; Van Donkelaar & Van der Laan 1994).

One major constraint for housing production is the long and arduous process of land acquisition, land registration, obtaining a development permit for the land and then obtaining a building permit. For land acquisition and land registration both statutory and customary law process has to be followed, though they do not usually work together efficiently in practice. Legal processes of getting a

development permit and building permit usually take a long time and might require extra money for the house builder to speed up the procedure (Van Donkelaar & Van der Laan 1994).

Lack of a well regulated land market is another constraint in the housing production. Traditional communal ownership of land has resulted in chiefs' and family elders' control of the land. Any person who is not a member of the controlling family is considered a stranger with no right of land acquisition. On the other hand, the dissolving of the traditional system causes land speculation. Although there is government controlled and managed land, it is far from meeting the demands (Konadu-Agyemang 2001). Low income groups are in the most difficult position to access land through both formal and informal systems since there are no affordable plots delivered by any of them (RICS 2006).

Lack of formal and informal supply of affordable plots for the low income in Ghana, makes informal additions to existing houses the only housing supply available for low income households. These additions are usually made for rental purposes or providing houses for relatives, although there is little space for extensions and they cause infrastructure problems in constricted streets (RICS 2006).

For Tipple (1987) the main characteristics of the housing policy in Kumasi had been the encouragement of the government of private sector's high standard housing production, government provision of water supply and sanitation for private facilities, direct provision of housing for civil servants by the government, and subsidising direct provision of housing for workers. Though direct provision of housing for civil servants was abolished (Tipple 1987). Colonial government's housing policy, until the independence in 1957, was to accommodate European colonialists separate from the local people in planned and serviced areas of the cities. Period between 1957 and 1990 is characterised by the government production of single family housing, which were far from solving the housing problem of the low income groups. Although government was supposed to provide low-income housing, single-family housing which was promoted was costly and not effective. Co-operative housing, upgrading the existing housing, and sites and services schemes inspired by Turner's (1972, 1976) views, were also implemented but the problem remained unsolved (Tipple & Korboe 1998).

In 1970's, Turner's (1972, 1976) views on the capacity of the poor to build houses for themselves, better and cheaper than the governments, have resulted in policy approaches to include multi actors in housing provision. These actors include the community, cooperatives, government, Non-Governmental Organizations (NGO), both formal and informal private sector and international agencies for provision of housing for the poor. Ghana's shelter strategy (1993) derived from this multi actor housing provision stressed improving the quality of shelter, improving human settlements' environment, making shelter programmes more accessible to the poor, promoting private sector involvement through an enabling policy environment, encouraging rental housing and promoting orderly growth with infrastructure in place. The strategy admitted that previous policies have been

inefficient in solving the housing problem of the poor and instead they promoted housing for the rich. However it relied on the old institutions for implementation and followed the inefficient lines of previous policies (Tipple & Korboe 1998).

Shelter strategy was also criticised for ignoring multi-habitation possibilities, which was a feature of accommodating low-income populations in Ghana. It also ignored use of local traditional materials referring to burnt bricks, roofing tiles, and wood as alternative building materials, which were rather expensive for the low-income to afford. Yeboah (2005) argued that neglecting the use of local traditional materials was especially problematic since the poor in Sub-Saharan Africa comprehended the building materials as a combination of traditional and modern in the self-help and self-build use of local materials. Moreover, informal housing provision in Ghana, especially by the efforts of the poor to house them was disregarded in the shelter strategy (Yeboah 2005). Therefore, the enabling policy environment foreseen by the shelter strategy, prescribing a less leading role to the government in the housing provision, resulted in the production of houses for the middle class by the private sector, sustained by profit motive (Afram 2007).

While the inefficiency was dominating the formal housing supply in Ghana, majority of the urban population in Ghana were housed with their own efforts or landlords' efforts through traditional and informal processes mostly in compound houses. Therefore, compound houses which did not fit into the building regulations inherited from the British Colonialists, constituted informal housing provision in Ghana. On the other hand these building regulations and government built public housing were reflections of government support for single-family housing. Current housing policy in Ghana promoted single-family housing through finance mechanisms, and an easier building permit process for villa type single family houses when compared to compound houses (Sinai 2001).

Government effort to promote single family houses might be explained by the incentive to provide less crowded, more comfortable and better quality houses than compounds. But, even though single family houses are preferred for representing a modern life, compound houses could be more advantageous than single family houses in terms of housing policy. They could be a more economic alternative for the possibility of being built and occupied incrementally. Moreover compound houses and villa type single family houses are usually built on the same size of plots as a result of traditional land allocation systems, but compound houses accommodate more people than villas since they allow multi-habitation. They comply more to the Ghanaian culture since they accommodate traditional extended families (Sinai 2001).

Considering the state of the current housing policy in Ghana, and its reflections on the general housing situation; there is a need to develop mechanisms to make housing affordable for the low income people. Housing policies and regulatory instruments must facilitate development as to accommodate the low income population. Efforts of the poor to build their own houses should not be ignored in developing affordable low income housing schemes. The major challenges that

the poor face in building their own houses like lack of legal security of tenure, the absence of financing mechanisms and cost of building materials should be dealt in the policies and regulations. The possible policy implications derived from these challenges necessitate an enabling role for the government in the multi-actor housing provision. This enabling role of the government should include already existing practices of self-help, self-build, extended family-help, or community-help, with an emphasis to provide the end-products of such processes with adequate basic services. At this respect, the compound house is worth considering as a housing option for the low income (Yeboah 2005).

2.3 Compound houses in Ghana

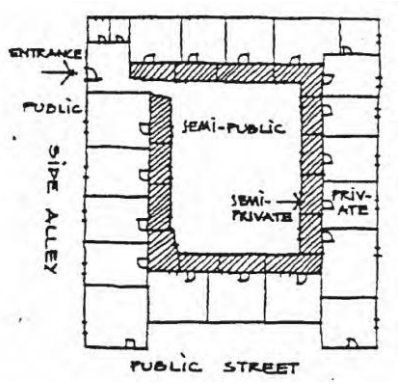
In his book, *Housing Supply in Ghana,* Tipple (1999) describes the housing situation in Kumasi, as compound and non-compound duality. Although government built houses comprised about 20% of the houses in Kumasi, they were so small compared to other forms of housing that they only generate the 7% of the total rooms in the city (Tipple & Korboe 1998; Tipple 1999).

Compound houses in Ghana are traditional houses that can be built by local materials and local techniques allowing them to be built by relatively low-income households for themselves. Single storey traditional compound houses have developed from the Asante compound houses which existed both in rural and urban contexts. It is traced that they could have developed from simple pitched-roof huts organized around a courtyard into a rectangular form with cement block decorations and verandas with pillars (Afram 2007; Tipple 1987).

Single storey compound houses are the main feature of the indigenous sector and they often have developed outside official control. Occupants of compound houses are mostly households of 4-6 persons, from the low income bracket. Majority of the households in Kumasi (69.7% in 1987) occupy only a single room in the compound, no matter the household size (Afram 2007; Tipple 1987).

Single storey compounds are often almost square structures with sides about 30 meters long. Usually ten to sixteen rooms are organized around a courtyard on three sides of the compound with verandas in the courtyard (Figure 3, p.14). On the street side they might have a raised veranda connected to the street level with steps. The main entrance to a compound house is often from the side streets in the form of a door that can be locked at night for security. On the fourth side of the courtyard, usually there is a bathroom, which is a room with a small hole to drain away water, and a kitchen which is a semi closed space open to the courtyard and used for cooking and storing the utensils. Most of the single-storey compound houses are built with traditional materials using rammed earth built in courses, known as ‘swish’ or ‘atakpame’. Few of the compound houses are built with sandcrete blocks. Doors and louvered windows of compound houses are manufactured locally (Afram 2007; Tipple 1987).

Figure 3: Typical plan of a single storey compound house



Source: Afram & Korboe (2009)

Most of the land in Kumasi belongs to the community of Asantes and their ancestors and it can be leased through a complex process which results in plots of almost same size. Consequently the rooms of the compound houses built on these plots have little variations in size (Sinai 2002).

There are two basic forms of compound houses, the older version is a single storey structure usually built of earth walls and wooden columns supporting the roof, the newer version has two or more storeys and built by more durable materials like reinforced concrete using blockwork technologies. The material used to build the houses is usually sandcrete blocks produced by mixing sand and cement, but also there are other materials like swish (mud), and landcrete blocks of sundried mud. Sandcrete is preferred for being more durable and its use becomes a status symbol. Both single storey and multi storey compound exhibit varying degrees of quality in materials, workmanship and decoration, and most of them are poorly maintained (Afram & Korboe 2009; Van Donkelaar & Van der Laan 1994).

Although, compound houses continue to constitute the prevalent housing form to accommodate urban poor, Afram and Korboe argue that their versatile and utilitarian qualities are not fully acknowledged by academics and policy makers (Afram & Korboe 2009). Life within the compound houses has advantages and disadvantages affected by the characteristics of the compound houses. Inhabitants have mentioned privacy, image, communal life and difficulty of extension without destroying the quality of open spaces as disadvantages of compound houses. However, they have advantages like being relatively low cost to build, being suitable for hot climate as well as traditional inheritance patterns and allowing shared use of services with known and trusted neighbours (Van Donkelaar & Van der Laan 1994).

Multi-habitation in a compound house provides mutual assistance and social harmony for its low income dwellers with the traditional communal life it encourages, while it has obvious problems like overcrowding, lack of privacy and poor service facilities shared by the households. Compound house reflects traditional communal living and is relatively cheap to build compared to the single family houses that the current housing policy promotes (Tipple 1999). Though

multi-habitation of the compounds provide solution for the continuous demand for rooms for the owner's household, rent-free rooms for relatives, and rooms for renters, no new compound houses are being built in today's Kumasi. Instead of compound houses, villa style houses are being built leaving few chances for low income population of the city to access affordable land and housing (RICS 2006).

Promotion of single-family housing instead compounds is questionable, considering the discussion on the advantages of the compound as a low income housing alternative. Tipple & Korboe (1998) argue that the process to produce compound houses present potential solution to the housing problem of the urban poor in Ghana, therefore policies should encourage it. Housing extensions in the form of addition of new rooms or sometimes another storey is very common in Ghanaian cities that growing population is absorbed through these extensions rather than new houses. In Ghana, where housing is usually not for sale, the motives of the people who build and extend their houses might help to guide a true enabling policy for the housing provision (Tipple & Korboe 1998).

2.3.1 Facilities of a compound house

Compound houses have shared facilities which are normally provided one for the whole house. In some multi storey compounds a shared facility might be provided for each floor. These shared facilities are used by several households in the compound (Tipple 1987).

In Ghana, cooking is usually done outdoors because preparation and cooking of traditional food is a long process. Cooking in a compound house is mostly done in the courtyard, which can be preferable considering high indoor temperatures and high humidity, but it can sometimes be disturbed by weather conditions. In a compound house kitchen is a semi-closed room, open on one side to the courtyard. Normally it does not have water supply or drainage system. Cooking is done while being seated over a charcoal stove, and preparation and washing is done in a large enamel bowl. Half of the compound houses have rooms which are originally built as kitchens but overcrowding resulted in using them as sleeping spaces or they are used as storage spaces due to climatic conditions. (Tipple 1987; Afram & Korboe 2009).

Apart from the rooms and the kitchen a compound may include an unfitted bathroom and a toilet usually in the form of an urination cubicle with a drainage hole. Normally a person uses a bucket to take a bath. The presence of a kitchen or a bathroom in the house does not necessarily mean that the house has water supply. Water supply, if exists is usually only one water tap shared by the whole house (Tipple 1987; Afram & Korboe 2009; Van Donkelaar & Van der Laan 1994).

Most compound house dwellers use public toilets and the bush for defecation. Public facilities might be inadequate in number, located far from the house and in poor condition. Especially public toilets are often in poor condition that they are

inconvenient to use and cause health threats to households using them (Tipple 1987; Afram & Korboe 2009).

2.3.2 Potentials of the compound house

Afram and Korboe (2009) state merits of the compound house as affordability, technology, capital efficiency, space hierarchy, security, land efficiency and adaptability.

Affordability

Shared services and utility spaces, caused by multi-habitation although creating problems lower the cost of construction for each accommodation unit. Shared facilities also decrease the costs of the infrastructure provision since the density in compound house neighbourhoods is high. These costs are relatively high in other neighbourhoods of low density where self contained villa houses are located in big plots.

Structural and constructional simplicity of the compound house does not necessitate the use of reinforced concrete framing, lowering the construction costs, thus contributing to affordability and accessibility. This simplicity also makes the construction process of the compound easy, not requiring expensive high trained workers but allowing owners build and extend compounds by themselves. The possibility to extend the compound is very important since land and services are extremely expensive.

The growth of a single storey compound house is usually an incremental process, where new rooms are added as long as there is funding, and completed rooms are occupied as new rooms are being constructed. Incremental building makes the construction of the compound feasible where funding for the construction might not be certain or stable. Incremental construction also allows obtaining small credits for building materials and craftsmanship, which are allocated by the suppliers to the builders who are known to them.

Capital efficiency is another feature of the compound to contribute to its affordability and accessibility. The construction process of the compound house, being an incremental one allows flexibility of phasing the construction. This enables the occupation of one or two rooms before the completion of the whole building, therefore accumulation and use of large capital might be unnecessary for this housing form when compared to other forms of housing. As a result of this affordability; low rents make the compounds popular for the low-income (Afram & Korboe 2009).

Space hierarchy

Compound house has a pure architectural form of rooms around a central courtyard. It has a clear hierarchy of spaces from the private bedrooms, to the semi-private veranda, semi-public courtyard and finally public side alley of the main street. Courtyards intentionally open to alleys rather than main streets enhancing their privacy. The pure architectural form of the compound, with a

clear hierarchy of spaces from private rooms to public alleys present an architectural quality, allowing easy transformation, which Afram & Korboe (2009) call 'versatility' (Afram & Korboe 2009).

Space hierarchy, as a merit mean the possibility of different activities taking place at different locations other than rooms within the compound. Courtyard or verandas in front of the rooms might be used for cooking, dining, drying clothes, storage and even for sleeping on humid and breezeless nights. Performing these activities within the semi-public space of the courtyard of a compound house provides a level of privacy for the inhabitants. While entrance to some of the rooms of a compound is from the yard, some rooms have additional access directly to the street. Placed in between the bedroom and the courtyard, veranda is a semi-private space, where households use for cooking, dining, storing and sometimes sleeping. While it was a transitional space when the compound house was occupied by one family in today's urban compounds veranda is a partitioned semi-private space used for less public activities of a household. While this partitioning is common in the single storey compound, in multi-storey form, the necessary use of Veranda as a transitional space serving the whole compound hinders portioning. In this case the balconies of upper floors are used somewhat similar to verandas of the ground floor (Afram & Korboe 2009).

Adaptability

Almost every compound house is used for some form of income generating activity, by one or more households**.** The room itself, the veranda, the yard and street can be used for such an activity. Existence of income generating activities makes the adaptability of compounds crucial. Replacing a window with a door on the facade of the house, in this case, changes the use of a room from domestic to commercial, without disturbing the inhabitants living in the adjacent rooms. The simple plan organisation of the compound house, with each unit having a direct access to the common courtyard, makes it possible for sub-divisions or new divisions without obstructing the other units (Sinai 2001; Afram & Korboe).

Multi-habitation

Compound houses are suitable for traditional inheritance patterns, as they can be extended to house the extended family. According to traditional inheritance system a compound house is the property of multiple owners which all have the right to live in. This multiple ownership makes the selling of the house is a complex process, while the obligations concerning kinship relations brings occupation of compound houses rent free by relatives of the owners (Sinai 2001).

Multi-habitation of the compound provides solution for the continuous demand for rooms for the owner's household, rent-free rooms for relatives, and rooms for renters. Multi-habitation is a cheaper way to house people and in line with cultural and social preferences and responsibilities (RICS 2006; Tipple & Korboe 1998), implying cultural adequacy. In spite of the problems connected to multi-habitation, compound house neighbourhoods present more cooperation and harmony among households when compared to the neighbourhoods dominated by other forms of housing.

Security

Multi-habitation of the compound house provides a passive security system. Most of the time, there are people in the house to watch the houses in case of fire or robbery. The entrance to the semi public courtyard of the compound house can be locked for security, creating a safe and secure area where children can play and they can be looked after while women can share housework (Afram & Korboe; Sinai 2001).

Suitability to climate

Compound houses are suitable for hot climate. The courtyard of a compound house has multiple uses making it a space to develop and nurture relations among households and create social harmony and cooperation in the compound neighbourhoods. Social integration created by the shared use of the courtyard makes it possible to keep open all the windows and doors facing the courtyard improving the climatic conditions of the compound (Afram & Korboe 2009).

Advantages of the compounds make them worth reconsidering, especially when the need to develop new forms of housing with advantages of the compounds is stated. Therefore, re-invigorating the compound form for the 21st century might be desirable for urban form as well as for economy. Versatility of the compound, with its affordability, simple and low-cost construction and extension, land efficiency and adaptability, makes it possible to consider compound house as an adequate low income housing option (RICS 2006).

2.3.3 Problems of the compound house

Inhabitants have mentioned privacy, image, communal life and difficulty of extension without destroying the quality of open spaces as disadvantages of compound houses. Shared spaces and services is considered a unique but problematic feature of compound housing. One other problematic issue about the compound houses is that they are considered to represent a traditional way of life, therefore devalued by young African households who preferred a modern life associated with western style housing (RICS 2006).

Cost of construction

Although compounds are relatively low cost to build compared to other forms of housing, they are large structures and building one could be costly even though individual rooms might be inexpensive to build. Therefore, builders of the compounds invest large sums of money to house the members of the extended family for free to satisfy cultural expectations (Garrod, Willis & Tipple 1995).

Problems related to habitability

High rate of occupancy of the rooms of the compound result in problems of privacy. Most households occupy only one bedroom, where parents, children and other nonfamily members of the household share the sleeping space, creating serious privacy problems. However this is an outcome of poverty and inability of the households to occupy more rooms, not a disadvantage inherent in the

architectural form of the compound. Furthermore large numbers of households using shared facilities, which are already insufficient cause overloading of the facilities. Inhabitants are mostly forced to use public sanitation facilities due to lack of toilet or water supply. (Afram & Korboe 2009; RICS 2006).

Traditional land allocation and inheritance systems in Ghana leave the households occupying the compound house with limited options when they wish to have more space. They have to occupy more rooms instead of occupying a larger room, since compound houses usually have similar rooms in size. If the families who would like to have more space are tenants, they have to rent more rooms in the compounds they live in or they have to move to another compound house to rent more rooms. If they are rent-free tenants, they usually do not have the chance to have more rooms in the same house, and then they need to move to another compound where they will be rent paying tenants, which signify that it is difficult for them to have more rooms. For the owners of the compounds, since they cannot easily sell their houses, the choice is more complicated. They need to provide rooms for the members of the extended family, since it is not acceptable to ask them to leave the house culturally. When owners like to have more rooms, they have to ask tenants to leave the rooms, which results in losing the rental income (Sinai 2002).

Maintenance problems

Earth walls of compound house can be worn out easily, due to lack of proper drainage systems. The waste water from the houses finding its course on the streets usually damages the walls of the compounds. The floor of the central courtyard if it's paved gets easily damaged by food preparation activities (Sinai 2001).

Despite its problems arising from the general housing situation in the country, but not inherent to its architectural qualities, the essential qualities of its architectural form, life style it encourages and its building process has potentials to be improved to provide adequate housing for the low income population in Ghana (Afram & Korboe 2009).

2.4 Adequate housing

Particularly in developing countries, as large part of the population lacks housing and services, provision of adequate housing is very important. Access to safe and healthy shelter and basic services is closely related to physical, psychological, social and economic well-being of people (UN-HABITAT 1996).

The quality of life is dependent on the conditions and characteristics of the built environment in the cities people live in. Liveability of the settlements are effected by layout of cities, land use plans, population and building densities, transportation and accessibility to all basic goods, services and facilities. This is more significant for the disadvantaged groups who cannot easily access to basic shelter and services. Furthermore, these people usually have more barriers to have a right to participate in decisions about the future of their settlements, whereas

their aspirations and needs should guide the design and maintenance of their settlements (UN-HABITAT 1996).

Improving living conditions in an equitable and sustainable way, requires providing an adequate shelter for everyone with basic services and facilities. An adequate housing should be healthy, safe, secure, accessible and affordable and have legal security of tenure. According to Habitat Agenda (1996); providing legal security of tenure, promoting access to safe drinking water, sanitation and other basic services, facilities and amenities, promoting access to open, efficient, effective and appropriate housing financing as well as locally available, appropriate, affordable, safe, efficient and environment sensitive construction methods and technologies, increasing the supply of affordable housing for both home ownership and rent purposes are objectives about adequate housing (UN-HABITAT 1996).

In order to comprehend the concept of adequate housing, it is essential to look at the set of indicators described to audit the 'full and progressive' realisation of the right to adequate housing.

Legal security of tenure

As the first criterion of right to adequate housing, legal security of tenure means protection of individuals or groups in terms of land and residential property, by an agreement defined in a legal or legislative framework. This agreement must provide protection against arbitrary eviction or expropriation. Tenure security is crucial for human dignity as well as for sustainable urban development. It assures the long term security of the house, thus it is an essential component of right to adequate housing. A household has a secure tenure when they are protected from eviction from their land, excluding exceptional circumstances and only on a known and agreed legal process (UN-HABITAT 2003b).

Availability of services, materials, facilities and infrastructure

This criterion implies that adequate housing must provide the essential requirements concerning health and well being of the inhabitants. Adequate housing must meet the basic needs of the community, therefore the Committee on Economic, Social and Cultural Rights states that it must provide safe drinking water, energy for cooking, heating and lighting as well as sanitation, washing facilities, storage for food, refuse disposal, drainage systems and emergency services. Water supply, sanitation, garbage collection, electricity supply, road construction, rainwater drainage and street lighting are essentials of adequate housing in terms of availability of services, materials, facilities and infrastructure (UN-HABITAT 2003b).

Affordability

Affordability requirement of the adequate housing signifies financial costs related to housing should be at a level that does not threaten or forsake satisfaction of other basic needs of the individual or the household. Housing expenses should not leave a constrained budget for other basic needs like utilities, food, clothing, transportation and health care. Adequate housing should be provided for low-

income groups that need assistance and subsidies. The monthly average cost of housing should not exceed approximately one-third of total monthly income, even though there might be exceptional cases (UN-HABITAT 2003b).

Habitability

Habitability criterion of right to adequate housing signifies that a house must provide adequate space for the inhabitants as well as protection from weather conditions, health threats, structural hazards and diseases. Adequate housing must be constructed with materials that provide protection and comfort for occupants. Housing must also provide adequate space for occupants, thus overcrowding should be prevented ensuring comfort and health for inhabitants (UN-HABITAT 2003b).

Accessibility

Accessibility of adequate housing signifies that disadvantaged groups must have complete and permanent access to adequate housing. Disadvantaged groups are defined as "elderly, children, the physically disabled, the terminally ill, HIV-positive individuals, persons with persistent medical problems, the mentally ill, victims of natural disasters, persons living in disaster-prone areas and other vulnerable groups", who should be ensured a degree of priority considering housing rights. Law and policy on housing should consider the special housing needs of these groups (UN-HABITAT 2003b).

At this point it is important to note that within the scope of this study the concept of 'accessibility' refers to that of the low income groups among the disadvantaged groups listed in the definition since the research area is a predominantly low income settlement. Members of other disadvantaged groups might be included in this broader group, but they are neglected for the focus of the study.

Location

The Committee on Economic, Social and Cultural Rights, states that adequate housing must be in a location which is convenient to access to employment opportunities, health-care services, schools, child-care centres and other public facilities in both urban and rural settlements. Transportation to these facilities can put excessive costs to the budgets of low-income households. At the same time, housing should not be built on polluted sites or close to pollution sources which threaten the health of the inhabitants, therefore adequate housing should not be built on or near environmental hazards, including garbage dumps and other such hazardous sites (UN-HABITAT 2003b).

Cultural Adequacy

The significance of housing in the lives of individuals and communities necessitate that housing must be culturally adequate, so that the construction, the building materials, and the policies connected to these must express the cultural identity of the occupants (UN-HABITAT 2003b).

The adequacy of the compound house is to be studied with the people primarily concerned, its inhabitants. Compound house inhabitants, might be the people who

build, own, rent, use and extend it, thus they have the most significant view on its adequacy. The contextual aspect of adequacy has cultural, social, environmental and economic dimensions differing according to specific place. Therefore, view of the inhabitants point out the most accurate vision on the adequacy of the compound house. Only then, compound houses, which already accommodate the low income population in Ghanaian cities, might be presented as an adequate low income housing option. Once their adequacy is discussed and assessed objectively, strategies to produce compound houses as a legal low income housing alternative might be enabled.

Among the seven components of right to adequate housing, habitability and accessibility are the ones most related to health issues.

Box 1: Adequate housing and health issues

General Comment No. 4 of the Committee on Economic, Social and Cultural Rights, which implements and monitors the International Covenant on Economic, Social and Cultural Rights (ICESCR) adopted in 1991, refers to World Health Organization's (WHO) 'Health Principles of Housing' which describes housing as the environmental factor most frequently associated with disease conditions in epidemiological analyses. The health principles of housing define significant factors affecting the relationship between housing and health. Protection against communicable diseases, protection against injuries, poisonings, and chronic diseases, reducing psychological and social stresses to a minimum, improving the housing environment, making informed use of housing and protecting populations at risk are stated as factors to affect the relation between housing and health. Protection against communicable diseases emphasizes the conditions of adequate housing such as safe water supply, sanitary disposal of excreta, refuse disposal, proper drainage of surface water, personal and domestic hygiene, safe food protection; and protection against disease transmission. Protection against injuries, poisonings and chronic diseases refers to construction materials and techniques for structural safety, proper ventilation and light, and quality of dwelling protecting its inhabitants from being exposed to dangerous conditions or hazardous substances (Thiele 2002).

2.5 Enabling shelter strategies

In Global Strategy for Shelter to the Year 2000 (GSS), as a strategy for providing adequate shelter for all, an enabling approach is stressed. Enabling shelter strategies meant involvement of all present and potential actors including the government, the private sector, NGOs and Community-Based Organizations (CBO) in production and improvement of shelter at the level where they can be most effective. While the main focus of the strategy is the low income groups, a comprehensive strategy to respect the housing needs of all income groups is emphasized (UNCHS 1990).

In many developing countries, majority of the existing housing has been built by the inhabitants themselves, usually by low-income population. Considering the incapacity of the governments in housing provision, a significant number of houses will continue to be built by their inhabitants in the future. Self-built housing is supported by regularization and upgrading schemes in many countries. Supporting the efforts of people who are individually or collectively producing housing, governments should search for ways to promote self-built housing using a comprehensive land use policy. Systematized self-built housing should be integrated into this land use policy through land registration schemes in a holistic housing and infrastructure system comprehension. Providing better access for self-built housing to housing resources in terms of land, housing finance and building materials is essential for the success of systemized self-built housing programmes. Likewise, studying the improvement of standards of self built housing, encouraging CBOs and NGOs to assist and facilitate self-built housing, facilitating dialogue and complete participation of all the actors of housing production at decision making stages and levels are crucial. Therefore, policies and programmes which anticipate unplanned settlements and self-built housing are required (UNCHS 1990).

Compound houses in Ayigya, Kumasi, are examples of self-built housing in Ghana. Since, settlements like Ayigya, present a solution to help the low-income to access housing, studying the adequacy of compound houses as low income housing option, might help to consider their provision in an enabling approach. In order to get a right definition of an enabling approach, its production and extension process, the actors involved, the source of finance, building materials used have to be identified.

2.6 Conceptual Framework

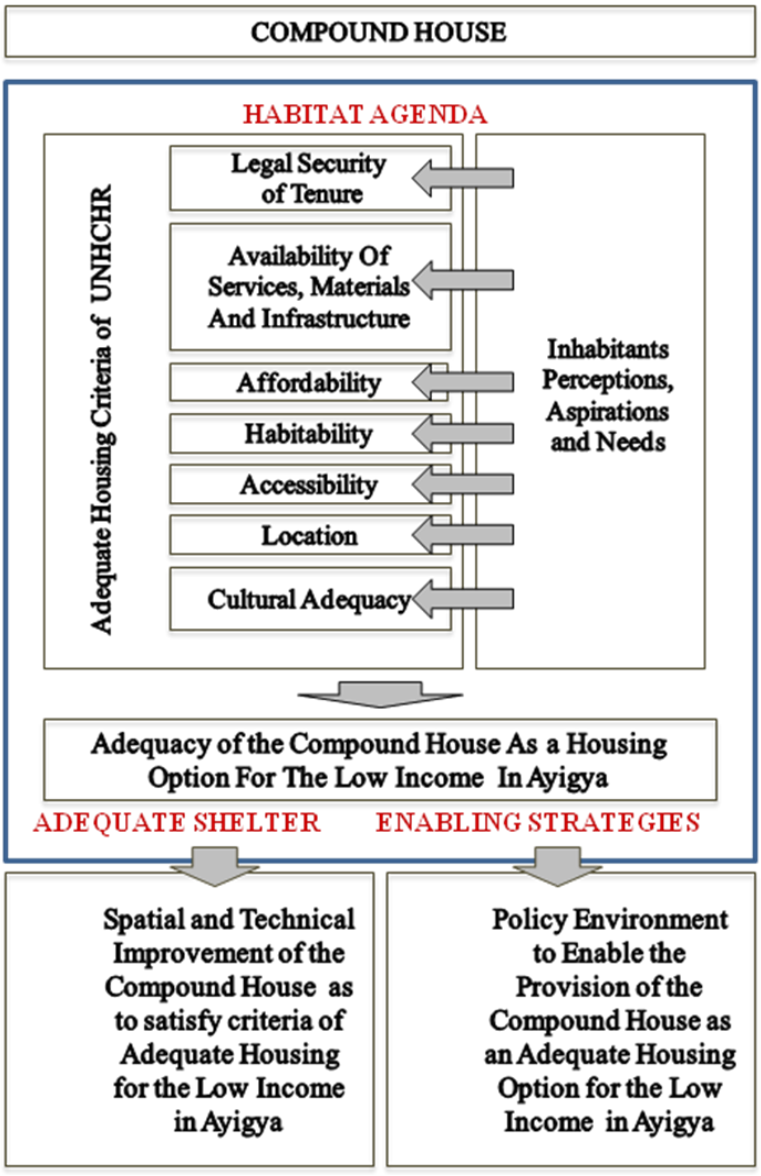
The relation between physical, psychological, social and economic well-being of the individual and the communities, and the condition of the physical environment they live in is the starting point of the conceptual background of this study. Considering access to a safe and healthy shelter and basic services, as a prerequisite for wellbeing of people, studying the prevalent housing form, the compound house and its services was crucial in Ayigya, where the situational analysis[5] of the area presented a poor state of wellbeing for the community.

Adequate shelter definition of Habitat Agenda provided a framework to assess the adequacy of the compound house, while the emphasis on the "contextual aspect of adequacy", as important as the definition itself, guided the methodology of the study. The need to specify the concept of adequacy with the people concerned necessitated learning their perceptions, aspirations and needs about the houses they live in. The criteria of right to adequate housing; legal security of tenure, availability of services, materials, facilities and infrastructure, affordability,

[5] The situational analysis of Ayigya, Kumasi was a requirement of the action planning workshop of Ghana Atelier; a joint project of IHS, TU-Delft faculty of architecture and KNUST college of architecture and planning.

habitability, accessibility, location and cultural adequacy were used to be the indicators to classify the perceptions, aspirations and needs of the compound house inhabitants. This was vital to justify the adequacy of the compound house. Assessing the adequacy of the compound house with respect to its inhabitants' perspectives was the prerequisite to achieve a description of its spatial and technical improvement as to satisfy the adequate shelter definition of the Habitat Agenda and the policy strategy to enable its provision as an adequate low income housing option (Figure 4).

Figure 4: Conceptual Framework



Source: Author, April 2010

Chapter 3: Research methodology

3.1 Research background

This study is linked to the 'Ghana Atelier[6]', which is a joint project of IHS, TU-Delft faculty of architecture and KNUST College of architecture and planning in Kumasi, Ghana. In a situational analysis done for the action planning and integrated development planning studies within the Atelier, 'inadequate housing' was identified to be among the main problems of the study area, Ayigya in Kumasi, causing the core problem of 'poor well being of the Ayigya citizens'. The improvement of the built environment, especially health and hygiene related infrastructure as well as general housing conditions were identified to be a development priority, for a low-income settlement like Ayigya with poor water, sanitation and waste disposal facilities. The relation between the general wellbeing of the people and physical environment they live in was stressed in the studies within Ghana Atelier, which have led to the chosen research topic: Inhabitants' perspectives on the adequacy of the compound house as a low-income housing option.

3.2 Research objectives

This research has started and proceeded under the assumption that the compound house represented a viable solution to alleviate poverty by improving quality of life and general wellbeing of its inhabitants. Therefore, the main objective of this study is to define a spatial and technical improvement process for the compound house as to satisfy the criteria of the right to adequate housing and describe the policy environment to enable its provision as an adequate low income housing option. Adequacy of the compound is evaluated in a framework defined by adequate shelter definition of the Habitat Agenda (1996) and criteria of the right to adequate housing by UNHCHR (1991), regarding perceptions, aspirations and needs of its inhabitants.

Evaluation of the adequacy of the compound house is based on views of the compound house inhabitants. This was a decision to grasp a contextual definition of adequacy by which a local housing form would be studied. Information on the inhabitants' perspectives on the compound house is considered to provide insight to improve its design, construction and services. This information is also considered essential to describe the policy environment to enable the provision of the compound house as a low income housing option, which has been outlawed by current building regulations and legislations. Therefore, this research, which is

[6] Ghana Atelier contained three series of workshops conducted in a period of two months. Workshops organised by the two Dutch institutes, IHS and TU-Delft, included 'Community development action planning for Ayigya', which was followed by the 'Contextual analysis of the study area' and finally 'Integrated Development Plan for the Settlement of Ayigya'.

expected to arrive at spatial and technical improvement and policy making decisions concerning a local housing form 'the compound house' intends to;

- reveal inhabitants perceptions, aspirations and needs concerning the compound house,
- discuss the relevance of compound house as an adequate housing option considering inhabitants perspectives with respect to right to adequate housing,
- define spatial and technical means to improve the compound house as to satisfy the criteria of right to adequate housing,
- describe the policy environment to enable its provision as an adequate low income housing option.

3.3 Research questions

The primary research question aims to describe the process by which the compound house inhabitants' perspectives can be used to formulate spatial and technical means of improvement for the compound and policy options to enable its provision. Revelation of the housing perceptions, aspirations, and needs of the compound house inhabitants in Ayigya, Kumasi is primarily needed to describe the process to translate them into spatial and technical improvement decisions and policy options. The adequacy of the compound house is to be assessed with respect to legal security of tenure, availability of services, materials, facilities and infrastructure, affordability, habitability, accessibility, location and cultural adequacy criteria of right to adequate housing, in the light of the perspectives of its inhabitants.

The primary research question of this study is:

How can the housing perceptions, aspirations and needs of the compound house inhabitants be translated into:

-Spatial and technical improvements to make the compound house an adequate low income housing option?

-A policy environment to enable the provision of the compound house as an adequate low income housing option?

Answering this primary question requires finding out:

- What are the housing perceptions, aspirations and needs of the compound house inhabitants concerning criteria of the right to adequate housing?
- To what extent can compound house be considered an adequate housing form satisfying the criteria of adequate housing namely; legal security of tenure, availability of services, materials, facilities and infrastructure, affordability, habitability, accessibility, location and cultural adequacy?

- What are the possible actions and strategies to improve the spatial and technical qualities of the compound house with respect to inhabitant's perspectives as to satisfy adequate housing criteria?
- What kind of a policy environment is needed to enable the provision and promotion of compound house as an adequate housing option for the low income?

3.4 Research type, instruments and strategy

This research is an exploratory and descriptive case study. It intends to explore the current situation of a specific housing type: 'the compound house' at a specific neighbourhood in Kumasi, Ghana: Ayigya. The research is exploratory because it seeks to learn the inhabitants' perspectives on the compound house and descriptive because it intends to discuss this information in a framework defined by the criteria of right to adequate housing.

Qualitative household surveys on a community (neighbourhood) level linked to the compound house formed the core of the research. Two household surveys were conducted in Ayigya and Zongo. A general household survey, conducted by the entire Ghana Atelier team helped to get basic socio-economic data as well as general data on housing and household characteristics in the neighbourhood. A second household survey was conducted specifically to compound houses and twenty houses were in-depth studied on issues regarding right to adequate housing.

A detailed questionnaire was developed to examine existing housing situation concerning key issues of right to adequate housing (Annex 1). The questionnaire aimed to capture personal and household characteristics of the respondents as well as their views concerning criteria of the right to adequate housing. Information on views on living in Ayigya, reasons for living in Ayigya and housing characteristics was collected by the questionnaire, which served as a base for an in-depth study of the chosen compounds.

Semi structured in-depth interviews was conducted to urban experts from academia, the local government and traditional authorities in Ayigya. These interviewees were selected purposively to get different perspectives on the issues studied. This information was essential to provide a scope and context for the study.

Transect Walk and photography was used to document the observations on existing situation of the area studied.

Literature review and Ghana Atelier workshops provided the secondary data, which constituted the backbone for the study. Information from the secondary data sources was especially important since it helped to achieve a familiarity to the context and the culture.

Different techniques of gathering information were used to guide the formation of the other, making it possible to compare and contrast the findings of each. By this way validation and triangulation of the information was achieved.

Finally, literature review, inhabitants' views, key informants' views and author's personal observations on the compound house were evaluated through the framework of criteria of the right to adequate housing.

3.4.1 Household surveys

General household survey

A general household survey was conducted by the entire Ghana Atelier team to randomly selected 180 households in the neighbourhood to get basic socio-economic data as well as general data on household and housing characteristics. The questionnaire for this survey was designed by the entire Ghana Atelier team to get information on population characteristics, household characteristics, housing characteristics, building materials, land acquisition patterns and land rights, water supply, sanitation, solid waste management, health issues and availability of health insurance, energy consumption and community participation patterns (Annex 2). General household survey formed a part of primary data; pilot tested on seven respondents then revised and conducted.

Compound specific household survey

A second household survey was conducted specifically to compound house inhabitants for an in-depth study of the chosen compounds. Questionnaires were applied to 35 randomly selected compound households out of 20 compound houses to get information on aspects of right to adequate housing. This household survey which formed the significant part of the primary data for the research was pilot tested on five respondents and revised before it was finally conducted.

This survey was also designed to gather information on population, household, housing characteristics, but this time framed by right to adequate housing criteria. The questions were designed to get information on legal tenure security, availability of services, materials, facilities and infrastructure, affordability, habitability, accessibility, location and cultural adequacy of the compound house. The survey intended to demonstrate the existing situation of the compound house, the reasons and opinions on living in a compound house, satisfaction level on services, materials, facilities and infrastructure and future plans about the house. A general description on the adequacy of the compound house is achieved out of this survey.

Household survey sampling design

Houses to be surveyed were chosen through a simple random sampling technique. Therefore, each household for the general survey and each compound household for the compound specific household survey could have a chance to be selected objectively. A boundary for the site was defined by the Ghana Atelier team, around the core of Ayigya, where compound houses were the prevalent form of housing. The site was divided into seven parts, each containing almost 50

compound houses. The decision was to go into every house, to see if there was an adult willing to respond the questionnaire. Vacant houses or the houses where people were not willing to participate were skipped. Finally, 180 houses out of 350 houses in the selected boundary were surveyed.

As for the compound specific household survey 35 persons were interviewed on adequacy of the compound house, out of 20 houses (Figure 5). There were multiple respondents (2 to 4) from 8 of the houses, where it was possible to have more than one person willing to contribute. In the case of multiple respondents, respondents were always chosen from different households, and preferably from different tenure status, to get different perspectives on the same house.

Figure 5: Surveyed compound houses in Ayigya and Zongo

Usually adult members of the households were chosen as respondents, with a median age of 33. Five respondents were under the age of 24, youngest being 18, and there were two respondents aged 70 and 72, representing the elderly. There were 17 female and 18 male respondents in the survey which presented an approximate equilibrium among sexes. Level of education was considerably high, majority of the respondents were high school and university graduates, where only four of them had no education.

Tenants formed the majority of respondents, followed by owners and rent free tenants. 19 of respondents were tenants, 11 were owners and 5 were rent free tenants.

3.4.2 In-depth interviews

Semi structured in-depth interviews were conducted to purposively selected key informants of different backgrounds. Criteria of the right to adequate housing were used to structure the in-depth interviews, thus same topics were discussed

with interviewees from different backgrounds. These interviews were expected to give pluralistic views on the adequacy of the compound houses from different perspectives. Academicians from KNUST, local government officials from KMA and a traditional authority in Ayigya, the chief of Zongo were interviewed. These interviews formed an important part of the primary data for the study to evaluate and assess data from other sources.

Two professors from the college of architecture and planning at KNUST were interviewed in order to get academic view on adequacy of the compound house with respect to criteria on right to adequate housing.

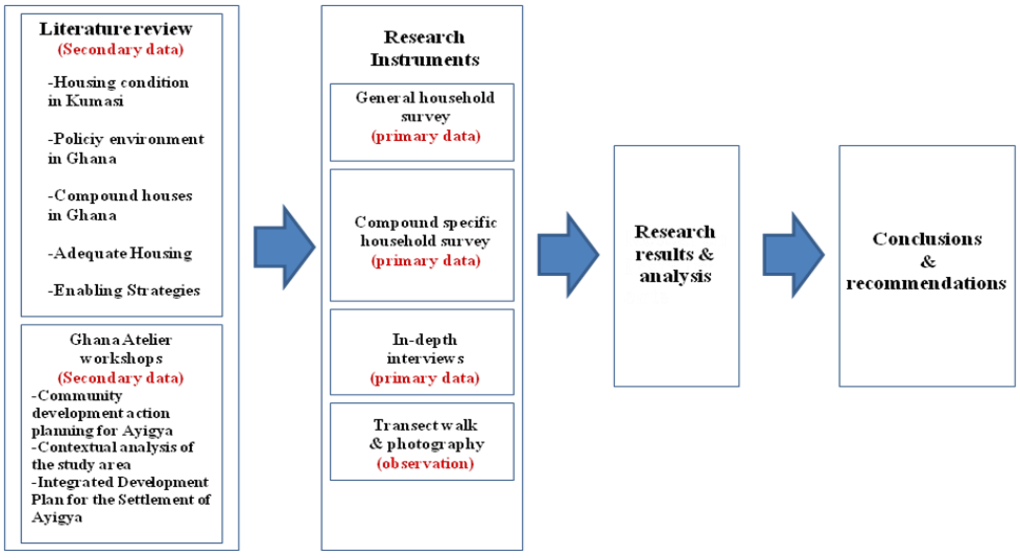
Two local government officials, an economic planning officer and a planning officer from housing and urban development department of KMA were interviewed to get further information on policy environment, on building regulations and legislations and on adequate housing criteria regarding the compound house from a bureaucrat's view.

Finally, The Chief of Zongo was interviewed to comprehend the situation of the compound house with respect to right to adequate housing criteria, from a traditional authority's point of view.

3.4.3Transect walk and photography

Transect walk and photography was used to document the existing situation, as part of data collection from observation. Walking along the neighbourhood and taking photographs, recording the evidences that can be associated with right to adequate housing, helped to gather information needed to evaluate the findings of the household survey. Transect walk also helped to track the key informants' points on the site, as well as information gathered from the literature review. It formed an essential part of the study since it allowed triangulation of the information which ensured the validity and reliability of the research.

Figure 6: Research design



Source: Author, 2010

3.5 Research variables, indicators, and operationalization

Research strategy can be traced in the table below, where each sub research question is detailed into variables, indicators and operationalization of variables. Data source for each sub research question is also listed in the table. Criteria of the right to adequate housing are used to form indicators for each question to provide coherence and consistency through the process. Operationalization table for the sub research question one, using household survey as the data source also guided the design of the questionnaire to be used for the compound specific household survey.

Table 1: Operationalization of variables

Research Question	How can the housing perceptions, aspirations and needs of the compound house inhabitants be translated into: -spatial improvements to make the compound an adequate low income housing option? -a policy environment to enable the provision of the compound as an adequate low income housing option?		
Sub Que. 1	What are the housing perceptions, aspirations and needs of the compound house inhabitants?		
Main Variables	Legal security of tenure /Availability of services, materials, facilities and infrastructure /Affordability /Habitability /Accessibility /Location /Cultural adequacy		
Main Variable	Variable	Indicator	Data Source
Legal security of tenure	Tenure status	Households experiencing eviction threat (%)	General Household Survey Compound specific household survey
Availability of services, materials, facilities and infrastructure	Existing level of service	Type of safe drinking water (%) Type of energy for cooking (%) Type of energy for lighting (%)	
	Satisfaction level with the service	The drinking water (%) The cooking energy (%) Electricity (%)	
	Reason of dissatisfaction	The drinking water (%) The cooking energy (%) Electricity (%)	
	Aspired level of service	Safe drinking water (%) The cooking energy (%) Electricity (%)	
	Existing materials	Type of wall materials (%) Type of roof materials (%) Type of window/door materials (%)	
	Aspired materials	Type of wall materials (%) Type of roof materials (%) Type of window/door materials (%)	
	Existing	Type of existing kitchen (%)	

	facilities	Type of existing bathroom (%) Type of existing toilet (%)
	Aspired facilities	Type of aspired kitchen (%) Type of aspired bathroom (%) Type of aspired toilet (%)
	Existing Infrastructure	Type of drainage system (%) Type of refuse disposal system (%)
	Aspired Infrastructure	Type of drainage system (%) Type of refuse disposal system (%)
Affordability	Current affordability	Income the household currently spends on housing (%)
	Aspired affordability	Income the household is willing to spend on housing (%)
Habitability	Current habitability	-Number of rooms occupied by the household -Total area occupied by the household -Number of people sleeping in the same room
		Households to experience health threats (%)
	Aspired habitability	-Rooms needed by the household (#) -Purpose of the needed rooms -Improvement plan about the house -Moving plan from the house
Accessibility	Level of accessibility	-The way house accessed (%) -Households to have accessibility problem (%)
Location	Location of the house	to the nearest public toilet to the nearest tro-tro station to the nearest primary school to the nearest health clinic to the job opportunities to the church/mosque to pollution sources
Cultural Ad.	Cultural Ad.	Households to sense cultural adequacy (%)

Sub Que. 2	To what extent can compound house be considered an adequate housing form satisfying criteria of right to adequate housing?
Variables	Legal security of tenure/Availability of services, materials, facilities and infrastructure/ Affordability/ Habitability/ Accessibility/ Location/ Cultural adequacy

Variable	Indicator	Data Source
Legal security of tenure	Households to experience legal security of tenure (%)	Household surveys In-depth Interviews Transect walk & photography Literature review Ghana Atelier Workshops
Availability (SMFI)	Households to experience availability of services, materials, facilities and infrastructure	
Affordability	Households to experience adequate affordability (%)	
Habitability	Households to experience adequate habitability (%)	
Accessibility	Households to experience adequate accessibility (%)	
Location	Households to experience favourable location (%)	
Cultural Ad.	Households to experience cultural adequacy (%)	

Sub Que. 3	What are the possible actions and strategies to improve the compound spatially and technically with respect to inhabitant's perspectives as to satisfy adequate housing criteria?	
Variables	Availability of services, materials, facilities and infrastructure / Affordability/ Habitability/Accessibility/Location/Cultural adequacy	
Variable	Operationalization	Data Source
Availability (SMFI)	Improvement in terms of availability of services, materials, facilities and infrastructure	Household surveys In-depth Interviews Transect walk & photography Literature Review
Affordability	Spatial and technical improvements in terms of affordability	
Habitability	Spatial and technical improvements in terms of habitability	
Accessibility	Spatial and technical improvements in terms of accessibility	
Location	Spatial and technical improvements	
Cultural ad.	Spatial and technical improvements in terms of cultural adequacy	

Sub Que. 4	What kind of a policy environment is needed to include provision of compound house as an adequate housing option for the low income?	
Main Variables	Legal security of tenure/Availability of services, materials, facilities and infrastructure /Affordability/ Habitability/ Accessibility/ Location/Cultural adequacy	
Variable	Operationalization	Data Source
Legal sec. of tenure	Policy environment needed to provide legal security of tenure	Household surveys In-depth
Availability (SMFI)	Policy environment needed to improve availability of services, materials, facilities and	

	infrastructure	Interviews
Affordability	Policy environment needed to improve affordability	Transect walk & photography
Habitability	Policy environment needed to improve habitability	
Accessibility	Policy environment needed to improve accessibility	Literature Review
Location	Policy environment needed to improve location	
Cultural Ad.	Policy environment needed to improve cultural adequacy	

3.6 Research validity and reliability

The validity and reliability of the research is based on the triangulation of primary data, secondary data and observation. The principles of right to adequate housing used as indicators for every set of data helped to operate the triangulation of the findings, building the reliability of the research.

Literature review, the theory forming the background of the study is tested and strengthened by the case study in practice. Literature review and the findings of the compound specific household survey, the general household survey, key informant interviews, and transect walk and photography were crosschecked, evaluated and assessed complementing each other. Criteria of right to adequate housing as stated in the Covenant of United Nations High Commissioner for Human Rights and the Habitat Agenda definitions of "adequate housing" and "enabling strategies" formed the framework of the research.

3.7 Research output

The expected output of the research was:
-to arrive at an objective assessment of the adequacy of the compound houses in Ghana,
-to define a possible spatial and technical improvement process for the compound house as to satisfy the criteria of adequate housing,
-to describe a possible policy environment to enable its provision as an adequate low income housing option.
In doing so, compound house might be considered as an adequate housing option for the low income in cities of Ghana. Massive housing shortage in Ghana justifies the significance of this research which is confirmed by the past studies. The research is expected to consolidate the previous research on the central role of the compound house as a housing provision for the low income and enable its provision as an adequate low income housing option.

3.8 Limitations

Unfamiliarity to the context and culture and in some instances the language barrier was the major limitations of the study. In the household surveys, UN

definition of household, based on a person or group of persons organizing food and other essentials of life on a more or less common budget was used. This definition was thought to be consistent with the life in compound houses, since many households lived in the same house but had separate housekeeping systems. But when households belonged to an extended family, some respondents had difficulty in replying questions on household characteristics such as number of household members. Also some of the household members' spending daytimes and sharing the food within the house, but going to the relatives' houses for sleeping made some responses complicated. Language barrier created a problem especially when interviewing the elderly, requiring the help of an interpreter. Although some information might have been lost or distorted because of the limitations, such incidences did not affect the overall research output.

Chapter 4: Research results & analysis

Results of the data collection are explained and analysed on seven components of right to adequate housing which are legal security of tenure, availability of services, materials, facilities and infrastructure, affordability, habitability, accessibility, location and cultural adequacy. Results presented in this chapter are a compilation of findings from household surveys, expert interviews and transect walk and photography.

4.1 Legal security of tenure

Concerning legal security of tenure; 54.29% of the respondents of survey on adequacy of the compound house were tenants, while 14.29% were rent-free tenants and 31.43% were owners. The households experiencing eviction threat constituted only 9 % of the households who were all tenants (Chart 1-2). Eviction threat existed only for a small proportion of tenant households as harassment from landlords asking them to move out or increase the rent or less frequently for rent-free tenants, who when the actual owner of the house dies, feel disturbed by the new owners expecting them to pay rent or move out.

Findings of the survey on existence of eviction threat were justified by the views of the local government officials who reported that evictions took place only when the houses were built on water courses, school land or primary routes.

Concerning the situation of tenants, according to law a tenancy agreement supposed to protect tenants, and landlords might evict tenants after three months notice.

In Ayigya, there is no eviction threat for the owners of the compound houses. There is an eviction threat for considerably small portion of tenants, thus legal security of tenure is mostly satisfactory for compound house inhabitants. In Ayigya, although most of the houses do not have statutory titles for the land and the house, customary law provides security of tenure for them. As a result, currently households in surveyed compound houses are not in need of tenure security in statutory terms.

Chart 1: Tenure status of the households

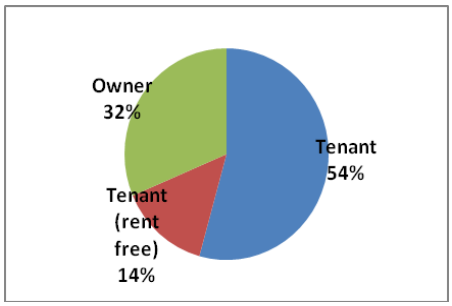
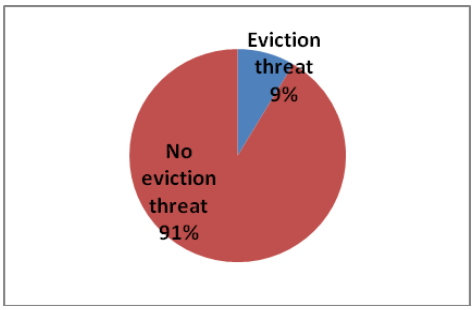


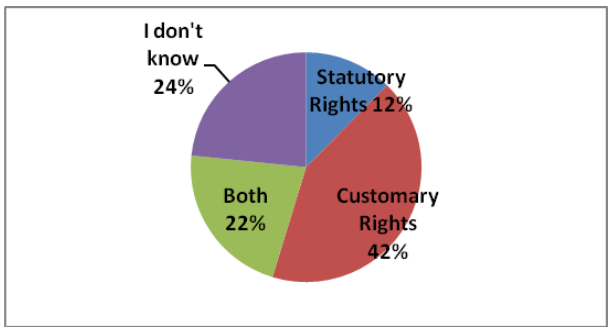
Chart 2: Existence of eviction threat



Source: Author's household surveys, July 2010

Owing to the small proportion of households feeling eviction threat and confirmation of this by the local government authorities and the traditional authority, it can be concluded that compound houses in Ayigya do not have urgent problems of tenure security. But it is important to note that, according to the results of the general household survey (Chart 3) there is an apparent state of confusion among households about their status with respect to statutory and customary laws and connected rights about the house and the land.

Chart 3: Status of property rights



Source: Author's household surveys, July 2010

4.2 Availability of services, materials, facilities and infrastructure

This criterion was the most problematic of the whole criteria of right to adequate housing when compound houses in Ayigya were concerned. This was an expected result, since in almost all of the previous research on housing in Kumasi, poor condition of services, facilities and infrastructure was mentioned. Poor maintenance of the compound houses were also stated in the previous researches which was the most common reason for low satisfaction levels with materials which were mostly very old and deteriorated.

4.2.1 Availability of services

Availability of services was surveyed on three main subjects; water supply, cooking energy and electricity supply. Availability of telephone and internet connection was also asked in the pilot test, but after finding out having a landline and internet connection was exceptional these questions were omitted from the revised form of the questionnaire. Local government officials also stated that considering the levels of income for the residents of Ayigya, having an internet connection was considered luxurious while having a landline was not a necessity since majority had mobile phones. About water supply; availability and type of water supply, satisfaction level with the current water supply, reasons of dissatisfaction with the water supply and preferred water supply were investigated. On cooking energy; type of the cooking energy, satisfaction level with the cooking energy, reasons of dissatisfaction with the current cooking energy and preferred cooking energy was investigated. Satisfaction with the supply of electricity was the last component of the services section.

4.2.1.1. Availability of water supply

Majority of the respondents (66%) used public tap as the main source of drinking water. Other 17% bought drinking water from their neighbours, while only 11% have piped water in the house. Another 6 % of the respondents used other sources like boreholes for water supply (Chart 4).

A total of 55% of respondents were dissatisfied with the water supply (Chart 5); because they preferred to have own piped water, they needed to go out of the house to get water, they queued for fetching water, and because the public tap was far and water was expensive, contaminated, and had irregular supply. Almost 90% of the respondents preferred to have own piped water supply in the house.

Chart 4: Main source of drinking water

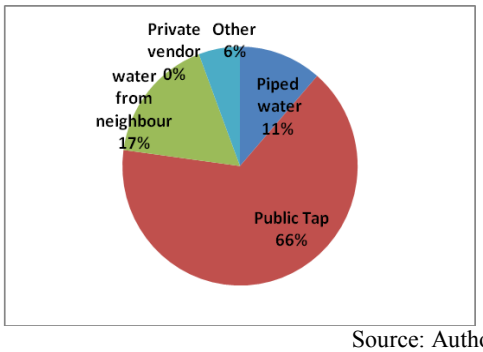
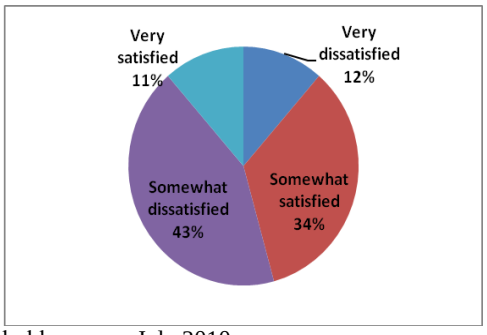


Chart 5: Satisfaction with drinking water



Source: Author's household surveys, July 2010

Informants from the local government mentioned inadequacy and irregularity of the water supply as a major problem for the whole country. Most households did not have piped water system in the house and they depended on public taps, neighbours who have piped connections or less hygienic sources of drinking water like boreholes. For the households lacking piped water in the house, the need to fetch and store water was tiresome, expensive and inconvenient reducing their quality of life. Furthermore overcrowding in compounds caused overloading of water supply.

The rate of houses which did not have piped water in the house appeared to be higher than the studies done by Tipple (1987)[7] and Van Donkelaar & Van der Laan (1994)[8], which were 56.5% and 36% respectively. Development of a public

[7]Tipple's book *The development of housing policy in Kumasi, Ghana, 1901 to 1981: with an analysis of the current housing stock,* which was published in 1987, contained data from 1500 households out of surveys conducted in 1980 and 1981. 1980 survey was conducted in 26 areas and 1981 survey was conducted in two high income areas in Kumasi.

[8]Van Donkelaar & Van der Laan's 1994 dated work *The Housing Situation in Kumasi: A Case Study Of Atonsu/ Agogo*, is based on 200 interviews conducted in Atonsu and Agogo which were two suburbs in the city of Kumasi. Atonsu and Agogo were also suburbs of indigenous sector just like Ayigya, therefore a comparison of the findings of this study and the surveys conducted in Ayigya might give an insight about the changes in the housing condition over 16 years.

tap network in Ayigya, which was non-existent in the field of Van Donkelaar & Van der Laan study, might be a reason of having fewer houses with piped water, but this does effect the general dissatisfaction with the current water supply.

4.2.1.2 Availability of cooking energy

Box 2: Use of charcoal as cooking energy

One of the widespread and serious energy problems in developing world is dependancy on use of traditional fuels such as charcoal. Energy problems of developing countries are two-fold. On one side, inefficient production and use of traditional fuels cause economic, environmental and health threats, on the other side uneven use and distribution of modern energy sources such as electricity, petroleum products and the like cause problems of economics, equity and quality of life. (Barnes & Floor 1996).

Choice of cooking energy is related to the affordability of a particular fuel, as well as availability and accessibility of different fuels and devices they require. Type of cooking energy is a good indicator of economic status, since as income rises type of cooking energy shifts from firewood or charcoal to kerosene to LPG or electricity (Sathaye & Meyers 1985).

Energy use pattern Ghana resembles many other developing countries: traditional fuels like firewood and charcoal are the main sources of energy. In Ghana, where there is no need of heating, energy is primarily used for cooking and lighting in the houses. In urban Ghana, charcoal forms the 61% of the fuel consumption, where fuel-wood forms 25% and LPG 10%. Other sources, like electricity, kerosene and crop residue form less than 4% of consumption. The majority of the poor depending on firewood and charcoal, use a variation of the three-stone stove for cooking. This cooking method is very inefficient, causing considerable amounts of indoor air pollution, negatively affecting the health of users, furthermore resulting in high fuel wood consumption, thus deforestation (Amissah-Arthur & Amonoo 2004).

Lack of clean and efficient sources of energy, makes it very difficult for people to improve their quality of life and to be productive. Use of kerosene and LPG is recommended to be encouraged in energy policies of the governments, since they cause less indoor pollution and reduce social costs of time and labour in gathering and using traditional fuels. They are not only more convenient and efficient in cooking, but they also cause less damage to user's health and environment (Barnes & Floor 1996).

Charcoal is the main source of cooking energy (64%), while Liquefied Petroleum Gas (LPG) is the second most common source of cooking energy. There is 35% dissatisfaction with the charcoal for being dirty, causing smoke, spoiling paint of the house, causing health threats, being difficult to set and keep fire. Users mentioned that it was very inconvenient to use charcoal when it rained since most of the surveyed compound houses had no proper kitchens and verandas were used for cooking. It was also mentioned that charcoal was not fast in cooking especially

when it rained. Still, majority of the households used charcoal for cooking, for it was easily available and cheap compared to the aspired cooking energy which was LPG. LPG was the second most common cooking source, and was also preferred to charcoal, but most households which used charcoal, mentioned LPG was expensive and difficult to get since supply and distribution of the LPG cylinders could be problematic.

Informants from the local government mentioned state's policy of encouraging the use of LPG instead of charcoal, since use of charcoal caused deforestation. But the policy was not enforced enough because of the irregular and inadequate supply of the LPG, while charcoal was always easily available. Both government and university informants stated that charcoal continued to be the predominant cooking fuel in spite of the government policy to encourage the use of LPG, because most of the urban poor could not afford the initial cost of the LPG cylinder and type of stove it required. They both mentioned that once this initial costs were met, use of LPG was even cheaper than charcoal. But the urban poor who lived "day to day" bought charcoal to use for the day from a much closer place.

Deforestation was mentioned as a negative impact of the use of charcoal. Another negative effect of use of charcoal concerning the environment was air pollution. It was easily observable that use of charcoal caused intense air pollution through the day which got worse in the evenings, when every household cooked at the same time.

In conclusion; use of charcoal, although being suitable for preparation of traditional food, caused health threats for the user, damaged the space it is used, moreover had negative effects on the environment, causing deforestation and air pollution

4.2.1.3 Availability of electricity supply

All respondents of the survey on adequacy of the compound house had electricity, 72% of them were satisfied with it. Cost of electricity and cut-offs in the power are mentioned as main reasons for dissatisfaction. There are frequent periods of no power varying in length from a few moments to more than a day. For Van Donkelaar & Van der Laan (1994) the breakdowns were caused by illegal connections to the main electricity cables.

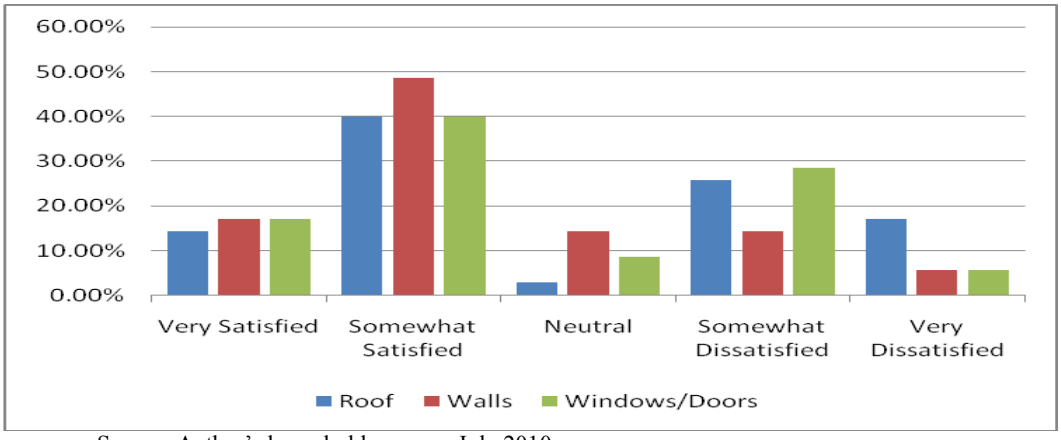
Power fluctuation and cut-offs are mentioned as the general problems for the electricity supply of the whole country by government officials. Professors from KNUST mentioned that the government had a subsidy for the low usage of electricity. A maximum usage rate was defined to provide electricity cheaper to the households using less than that rate. Nevertheless, in most of the compound houses, all the households shared one electricity meter, so that they crossed the maximum rate and could not benefit from the subsidy. For most of the households, electricity was overbilled due to the use of shared meter, although usage per household was within the range of the subsidized tariff.

4.2.2 Availability of materials

Availability of materials was investigated on three groups of materials, being roofing, walling and window/door materials. For each respondent's house, after identifying the type of materials used for roofing, walling and window/doors, respondents were asked if they were satisfied with them, reasons of dissatisfaction and the material they preferred instead of the current ones.

In most cases, the compound houses in Ayigya were built more than 50 years ago, thus they were very old and poorly maintained**.** While there was a continuous building activity in the neighbourhood due to building of extensions and a wide range of materials were used for extensions, all the surveyed houses had corrugated iron sheets as roofing materials. Mud (landcrete), and cement blocks (sandcrete) were predominant walling materials. Windows and doors were made of wood, while some had glass, some only had mesh.

Chart 6: Satisfaction with materials



Source: Author's household surveys. July 2010

Preferred building materials were usually new roofing sheets, aluminium sheets and shingles. Some respondents mentioned that they would like to have plastered and painted walls while all of the households who were dissatisfied with windows needed windows with glass, for protection against robbery and mosquitoes.

There was 43 % dissatisfaction with roofing material, because the roofs were old and leaking, 20 % of dissatisfaction with walling material was because they were old, dirty and having termites, and 35 % dissatisfaction with window/door materials was because they were old and broken (Chart 6).

Informants from the local government also mentioned that the problems about building materials are mostly because the compound houses in Ayigya were old and deteriorated. Corrugated iron sheets were sensitive to corrosion by water and they needed to be replaced in time. Corroded iron sheets caused leaking in roofs, and they could be ripped off by the wind. Tiles are recommended as roofing materials by the government officials.

For key informants from both local government and the university, walling materials performed well if they were maintained properly. As Yeboah (2005) pointed out with the right maintenance houses that was built in Atakpame techniques, still stood for over 100 years. In fact for the professor from KNUST, they were the best materials to be used for compound houses since they required no specific technology and skilled workmanship. But lack of proper drainage system caused deterioration of the outer walls especially, in some cases leaving the foundations of the compound exposed (Figure 7-8). Mud (landcrete) was a cheap, easily available building material, and a perfect thermal insulator as mentioned by academicians, but although it was more expensive people increasingly preferred cement blocks (sandcrete) to mud since it was considered modern.

Figure 7: Exposed foundations

Figure 8: Deteriorated walls

Source: Author, July 2010

4.2.3 Availability of facilities

Availability of facilities was investigated on kitchens, bathrooms and toilets[9]. For kitchens, bathrooms and toilets every respondent was asked about the type of facility they had, satisfaction level with the facility, reasons of dissatisfaction with the facility, and preferred type of facility.

Shared use of facilities was the reason of dissatisfaction in most cases. Most respondents mentioned that facilities were not in good condition and they were overloaded due to overcrowding. Furthermore cleaning and maintaining them created problems among households. Informants from KNUST, mentioned that shared use of facilities were not a problematic issue in the earlier times when compounds were occupied by households of one extended family. Starting with renting the rooms to tenants other than members of the extended family broke the former discipline of using the shared facilities and issues like cleaning and maintaining them became problematic creating tension among different households.

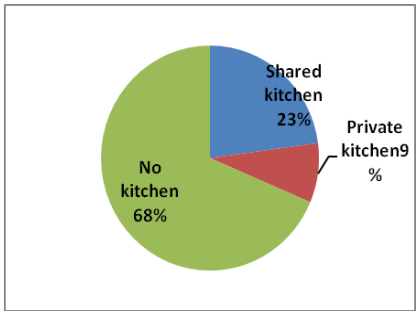
[9] In the pilot test questions about the availability of food storage were also asked, but after finding out having food storage was exceptional for the compound houses in Ayigya, although there was an apparent need for it, those questions were taken out of the revised questionnaire.

4.2.3.1 Availability of kitchen

Majority of the households, 24 out of 35 (68 %), in the surveyed compound houses had no kitchen (Chart 7). Respondents stated that they cooked in their verandas or in front of their rooms in the courtyard. This number is higher than the percentage of the households having no kitchen in studies by Tipple (1987) and Van Donkelaar & Van der Laan (1994) which were 24% and 45% respectively. This might be a regional difference in city of Kumasi but it might as well be affected from conversion of kitchens to bedrooms or storage spaces[10]. 23 % of the households had shared kitchens which were semi-closed spaces in the courtyard (Figure 9). Also another important issue about the availability of kitchen was that, the fact that there was a kitchen in a compound house did not mean it was actually used. It was too common to observe households cooking everywhere in the courtyards and even in the alleys. In fact too many people sharing one kitchen had resulted in disuse of kitchens, which was also stated by Van Donkelaar & Van der Laan (1994). Only 9 % of the households had private kitchens.

55% of the households were dissatisfied with the kitchens. Reasons of dissatisfaction were stated as: having no kitchen at all, using verandas for cooking, sharing the kitchen, having no privacy in the kitchen and kitchens being small, not neat, and not clean.

Chart 7: Type of kitchen



Source: Author's household surveys, July 2010

Figure 9: A shared kitchen

Source: Author, July 2010

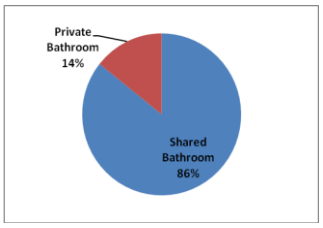
Almost all of the households preferred private kitchens in their living space. Some respondents and the chief of Zongo stated the need for food storage.

[10] Kitchens being converted to bedrooms, bathrooms or used as a storage space for food and kitchen utensils are mentioned in previous studies by Tipple (1987), Van Donkelaar & Van der Laan (1994), Konadu-Agyemang (2001), Afram (2007) and Afram & Korboe (2009).

4.2.3.2 Availability of bathroom

While 86% of the respondents had shared bathrooms, 14 % had private bathrooms (Chart: 8). Private or shared, a bathroom in a compound house is usually a cubicle which is around one square meter where a bucket is used to take a shower (Figure 10-11). Shared bathrooms in the courtyard were usually fully closed spaces. In some cases they only had walls with no roof.

Chart 8: Type of bathroom



Source: Author's household surveys, July 2010

44% of dissatisfaction with bathrooms were due to sharing, too many people using them, queuing for bathing, inconvenience to use them at night, both sexes using the same one, cleaning creating a problem among users, and due to bathrooms being not neat, very dirty and not hygienic.

Figure 10: Shared Bathroom

Figure 11: Private Bathroom

Source: Author, July 2010

There were no houses without access to a bathroom, but shared bathrooms in compound houses were described as inconvenient and inadequate by government officials since sometimes they were used by more than thirty people causing long queues and congestion especially in the mornings. Working residents of the compound houses usually woke up very early to be able to use the bathrooms.

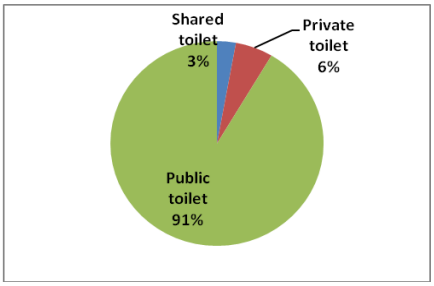
Private Bathrooms with necessary fittings were preferred by all of the respondents.

4.2.3.3 Availability of toilet

Public toilets were predominantly used by the compound house inhabitants (91%); rest of the inhabitants used shared toilets or private toilets (Chart 9). There was an 83% of dissatisfaction with the toilets, as the highest dissatisfaction rate in the whole survey regarding facilities. Dissatisfaction reasons varied considerably and most common reasons included the distance of the public toilet from the house and dirtiness. Public toilets were described as not hygienic, not neat and not safe especially for women. Mostly women respondents reported that it was inconvenient to use them at night and in case of sickness. The long queues to use the toilets were also a common reason of dissatisfaction. Many users reported they did not have access to toilets when they needed and they had to wake up very early to use them. Public toilets were congested due to the number of people using them. Payment for the public toilets, which was mostly 10 pesewas[11] was also a common reason of dissatisfaction. Public toilets are usually built far from the houses for hygienic reasons but they caused dissatisfaction because of being far, and when they were situated close to the houses, they again caused dissatisfaction as sources of pollution, poor hygiene and bad smell.

Shared toilets in compound houses also caused queuing. They usually got spoiled quickly since too many people were using them, furthermore cleaning and emptying them created problems. Some respondents mentioned that although the compound house had a toilet, it was not being used for the inconveniences of the shared use and cleaning and maintenance problems related to the shared use. Most of the shared toilets were Kumasi Ventilated-Improved Pit (KVIP)[12] latrines and few were flush toilets.

Chart 9: Type of toilet



Source: Author's household surveys. July 2010

The proportion of the households without access to a toilet in the house (91%) is much higher than the studies by Tipple (1987) and Van Donkelaar & Van der Laan (1994) which were 30 and 13 percents respectively. One explanation for this might be total elimination of use of bucket latrines which were banned by KMA in the 1980's. They were still in use when surveys by Tipple (1987) and Van Donkelaar & Van der Laan (1994) were conducted, constituting 30% of the toilets in the latter study. Also disuse of the present toilets due to inconveniences of

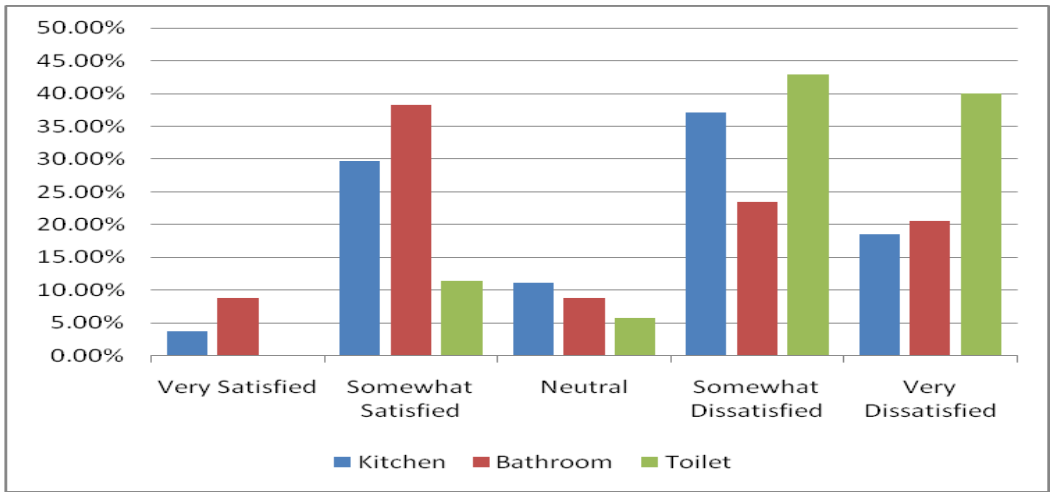
[11] Pesewa is the subunit of the Ghanaian cedi. 100 pesewas equal 1 cedi which is approximately 0.55 euro currently.

[12] KVIP Kumasi Ventilated-Improved Pit (Van Donkelaar & Van der Laan 1994) or Kumasi Ventilated-Indirect Pit (Tipple 1999) is an improved type of pit latrine developed in Kumasi.

shared use might have increased the number of households which are dependent on public toilets. Population growth and densification in the compound houses without an increase in the number of toilets per house might have as well contributed to the dependency on public toilets.

Chart 10 demonstrates the comparative satisfaction with the facilities.

Chart 10: Satisfaction with the facilities



Source: Author's household surveys. July 2010

Government officials reported that the use of public toilets and shared toilets were inconvenient and they stressed the need for every household having their own toilet. Although current legislation required the conversion of the bathroom cubicles of compounds into water closets or KVIPs, lack of sewage system and piped water system in most houses, make the use of flush toilets unfeasible. On the other hand, use of KVIPs had other problems like being not suitable for the high number of people using them, furthermore cleaning them and financing the emptying caused tension among households. Private toilets, especially flush toilets are preferred by respondents.

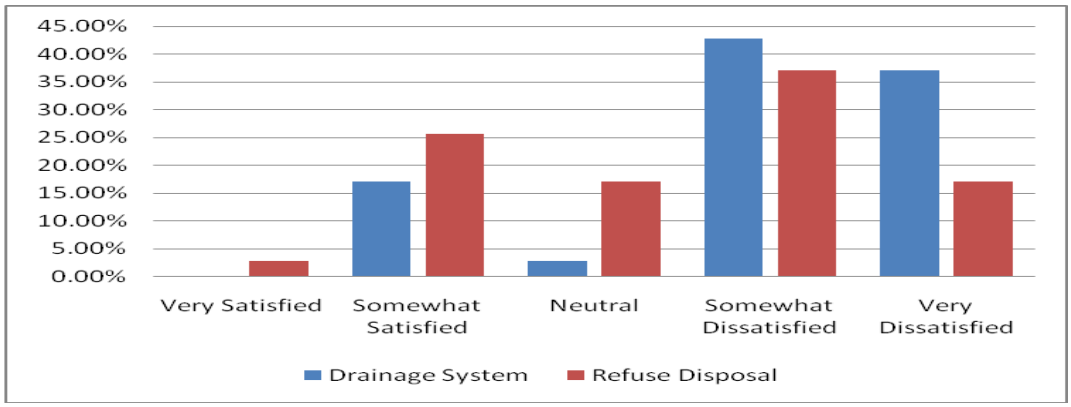
4.2.4. Availability of infrastructure

Availability of the infrastructure was surveyed on two subjects; drainage system and refuse disposal. Respondents were asked questions about the 'open gutters', which were the current drainage system in Ayigya. They were asked if they were satisfied with the open gutters as a drainage system, reasons of dissatisfaction, and preferred drainage system. Similarly for 'refuse dumps' which formed the current solid waste management system respondents were asked about their satisfaction levels, reasons of dissatisfaction and preferred refuse disposal.

A sewage system did not exist in Ayigya, since majority of the compound houses do not have toilets in them. According to the findings of the general household survey, private or shared toilets in the few compound houses needed to be emptied mechanically or by the use of a chemical.

Chart 11 demonstrates comparative satisfaction with the infrastructure.

Chart 11: Satisfaction with infrastructure



Source: Author's household surveys. July 2010

4.2.4.1 Availability of drainage system

Open gutters is the current drainage system in Ayigya. Built open gutters are only on the main roads, in secondary roads dirty water finds its course in inbuilt gutters causing erosion (Figure 12).

80% of the respondents reported dissatisfaction with the open gutters, which was the second highest dissatisfaction level in the survey after dissatisfaction with the public toilets. Reason of dissatisfaction for the majority was that open gutters were a breeding place for mosquitoes causing malaria. Other reasons of dissatisfaction included causing bad smell, being easily plugged by rubbish and making the settlement very dirty. Open gutters were described as untidy, unhygienic, and dangerous for children to fall in. Closed gutters and piped drainage system were preferred by respondents, and seen as crucial to prevent malaria.

Figure 12: Drainage system in Ayigya, inbuilt and built open gutters

Source: Author, July 2010

Running of grey water[13] openly in streets were also seen as a major pollution source by the academicians, the chief of Zongo and some respondents. Dirty water in the open gutters at the roads in Ayigya was supposed to contain only grey water from activities like bathing, washing the dishes and laundry, but due to the common use of bathrooms for urination it also contained urine making the gutters a major source of pollution and bad smell. The chief of Zongo, mentioned that the media informed people about the grey water containing urine, but the change of behaviour was very low. Chief noted the importance of a closed gutter system to prevent malaria, and he also mentioned erosion effect of inbuilt open gutters harming the foundations of the compound houses.

4.2.4.2 Availability of refuse disposal system

Public refuse dump is the current refuse disposal system in Ayigya (Figure 13).

Figure 13: A refuse dump in Ayigya

Source: Mervin Mwansa, July 2010

54% of the respondents reported dissatisfaction with the refuse dump. Reasons of dissatisfaction included being too far, wasting time to get there, being not neat and not hygienic, being used as toilet, causing bad smell, causing disease when close to houses, causing sickness to children, being inconvenient to use and being filled easily. Like location of the public toilets, location of the refuse dumps created different problems when they were far and when they were close to the houses.

Private containers taken by vehicle are preferred by all the respondents, while some of the respondents noted that secondary roads in Ayigya were not wide enough for such a system. Local government officials noted that regularity of the collection from the communal refuse dump formed the efficiency of this system, and for them this system was well designed, but the problems were arisen because of users' dumping refuse in unapproved places.

[13] Composition of the grey water depended on the sources where the water is drained from; kitchen, bathroom or laundry. It might contain chemicals used by the household or from the pipes, but generally it contains lower levels of organic waste when compared to ordinary wastewater, since it does not contain urine and faeces **(**Eriksson et al. 2002).

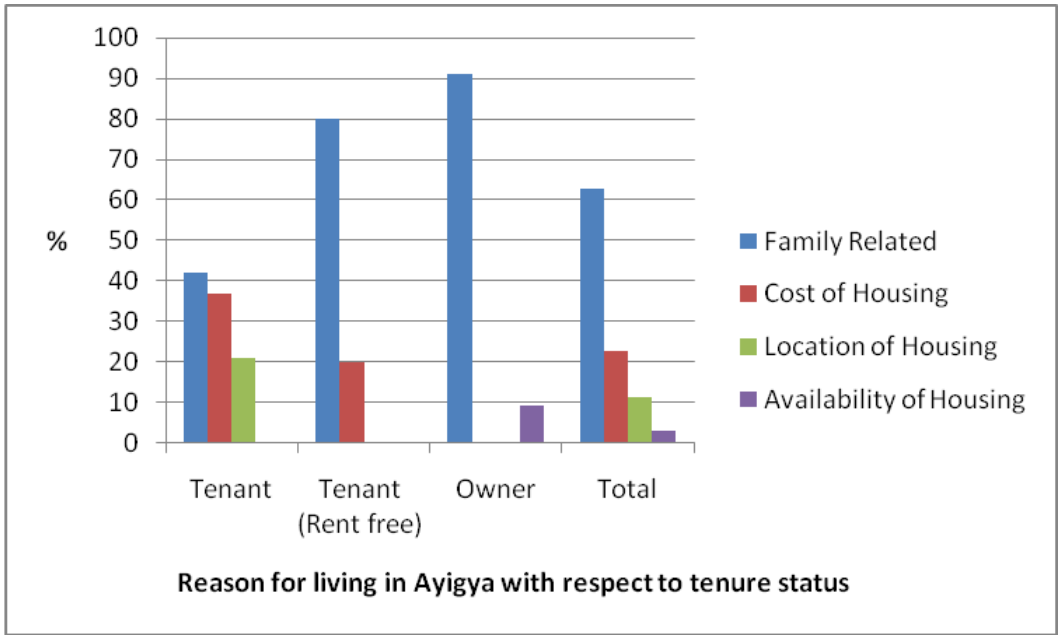
4.3 Affordability

Owners buy (9%) or inherit (26%) the compound houses. Purchase is financed by savings (75%) or money from relatives (25%). Tenants rent the house or occupy it rent free as members of the extended family of the owners. Owners ask chief's permission for buying the house (land for the house), whereas tenants do not need to ask chief's permission.

For academicians, in the core area of Ayigya, no vacant land is left for building new compound houses. Moreover, they claim that even the land reserved for public spaces in the formal land use plan of Ayigya were sold by traditional authorities. Chief of Zongo also states that there was no land for building new houses in Ayigya.

47% of the respondents, mostly tenants, spend more than half of their income on housing, including payment for water, electricity, source of cooking energy, repairs and so on. This is a higher proportion than the UN standard which states that, a house is considered affordable when percentage of income spent on it per month is not more than one third of total monthly household income (UN-HABITAT 2003a). Still, 'cost of housing' is the second most common reason to live in Ayigya (23%) (Chart 12) implying affordability, while majority of the respondents (77%) are willing to spend less than they already do.

Chart 12: Reason for living in Ayigya with respect to tenure status

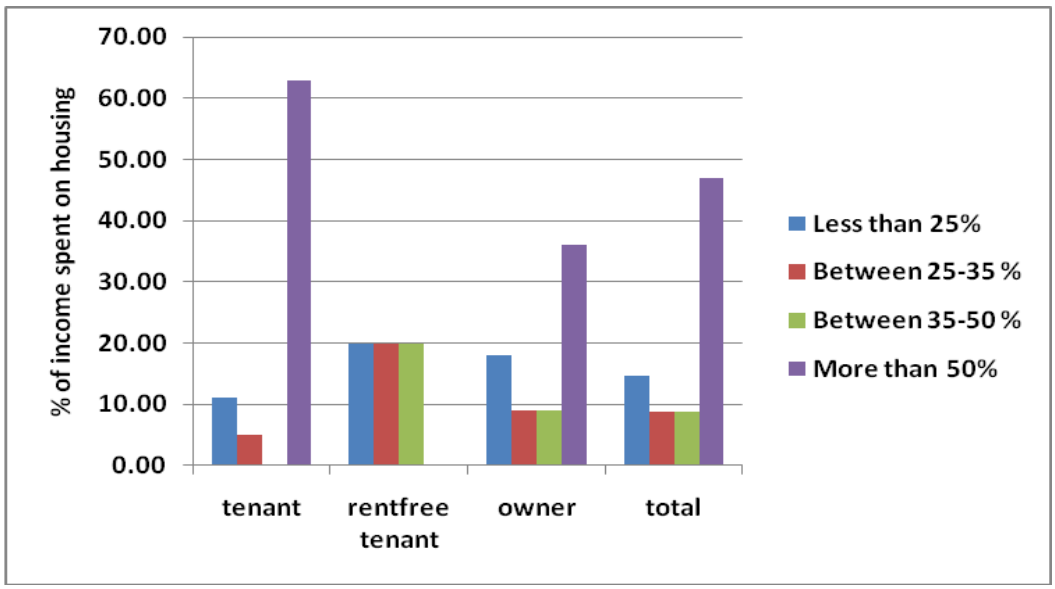


Source: Author's household surveys, July 2010

While almost half of respondents spend more than half of their income on housing, these respondents are mostly tenants; therefore it is right to say that a compound house in Ayigya is significantly more affordable for owners and rent-free tenants, than tenants. Although, for key informants from both the local

government and the university; compound houses, including the ones in Ayigya, are the most affordable forms of housing to rent (Chart 13).

Chart 13: Affordability with respect to tenure status



Source: Author's household surveys. July 2010

Local government officials think that building a house in Ghana is very expensive, building a new compound is no exception to it. Theoretically and legally land is not for sale in Ghana. Traditionally, it is acquired from the chiefs who control the land, by paying 'drink money'[14]. Legally land is not sold but leased for 99 years. But in practice, for local government officials land is 'more or less' sold. The process of acquiring land from the chiefs is commercialized so that people who want to get land from the chief has to offer more than the drink money. Scarcity of land also makes it difficult to acquire land in favourable locations. People have to build on the peripheral vacant land. Acquiring land and building materials make the building process very expensive, but for local government officials it is still worth investing in compound houses since they have more rooms when compared to other forms of housing.

For key informants from the university, building a compound is cheaper than building another form of housing because of the shared use of facilities. Building free from government control and using building materials and techniques that do not comply with building standards and regulations also contribute to the affordability of the compound house.

[14] Drink money is the sum paid to the local chiefs for land acquisition, which is not the actual price of the land, but a tribute to ancestors who were presumed to own the land (Tipple & Korboe 1998; Devas & Korboe 2000).

For the chief of Zongo, renting a room in a compound house is affordable, but it is not favourable because the standard and the quality of the rooms were not good due to the inadequacy of the services, facilities and infrastructure.

4.4 Habitability

The single storey compound houses in Ayigya have a median number of rooms of 14. This is higher than the median number in the previous studies by Tipple (1987) and Van Donkelaar & Van der Laan (1994) which were 8 and 9 respectively for single storey compound houses. This might be explained by extensions[15] conducted in recent years, since majority of the surveyed houses had been extended by adding new rooms.

Compound houses accommodated a median number of 7.1 households. Overall median household size was 6.6. Owner households were usually the most crowded households, followed by households of rent free tenants. Tenants in the survey had the smallest median household size (Table 2).

Table 2: Median household size with respect to tenure status

Tenure	Tenant	Tenant (rent free)	Owner
Median household size	5.47	6.6	8.63

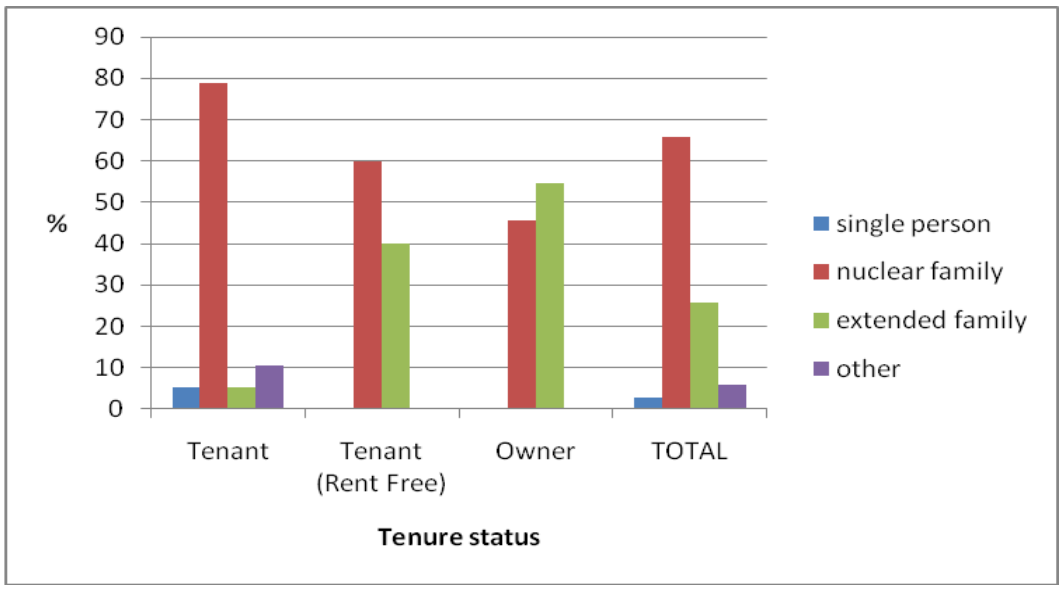
Source: Author's household surveys. July 2010

Majority of the respondents had nuclear families. Tenants had more nuclear families when compared to rent free tenants and owners. Some nuclear families were crowded having 10 to 12 members. Most of the owner households were extended families as a result of the traditional responsibility for house owners to accommodate members of the extended family which was the reason of being more crowded.

Single person households existed only among tenants, and represented less than 3% of the whole households which contrasted the findings of survey done by Tipple in 1980, where 17% of households in the indigenous sector were single person households (Tipple 1987). On the other hand, the result is in line with the survey conducted by Van Donkelaar & Van der Laan, who had explained that tendency of Ghanaian men to live separately from their wives and children as expressed by Tipple (1987) as an explanation to the high percentage of single person households, was eroded in time due to affordability problems (Van Donkelaar & Van der Laan 1994). Households represented under the label 'other' included siblings living together without the parents or single parents with children (Chart 14, p. 53).

[15] RICS (2006) discusses that compound houses are subject to intense extension activity.

Chart 14: Household configuration with respect to tenure status



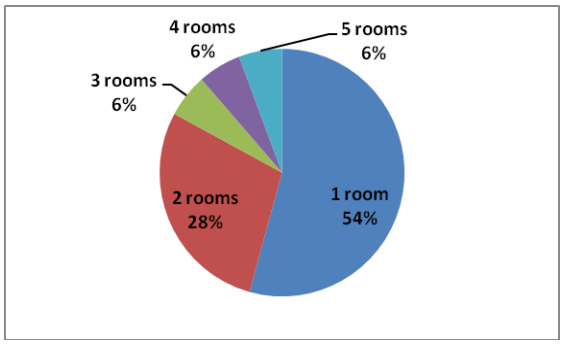
Source: Author's household surveys. July 2010

More than half of the respondents (54%) occupied only one room for their private use. Another 28 % occupied two rooms (Chart 15). A room in a compound house is usually between 12 to 16 square meters. In some cases, one room that the whole household occupied had a closed veranda space which was originally a semi closed-semi private space adjacent to the room. The addition of the veranda space usually added approximately five square meters to the room, creating an habitable space around 20 square meters, called as 'chamber and hall' by some respondents.

Box 3: Habitable Space

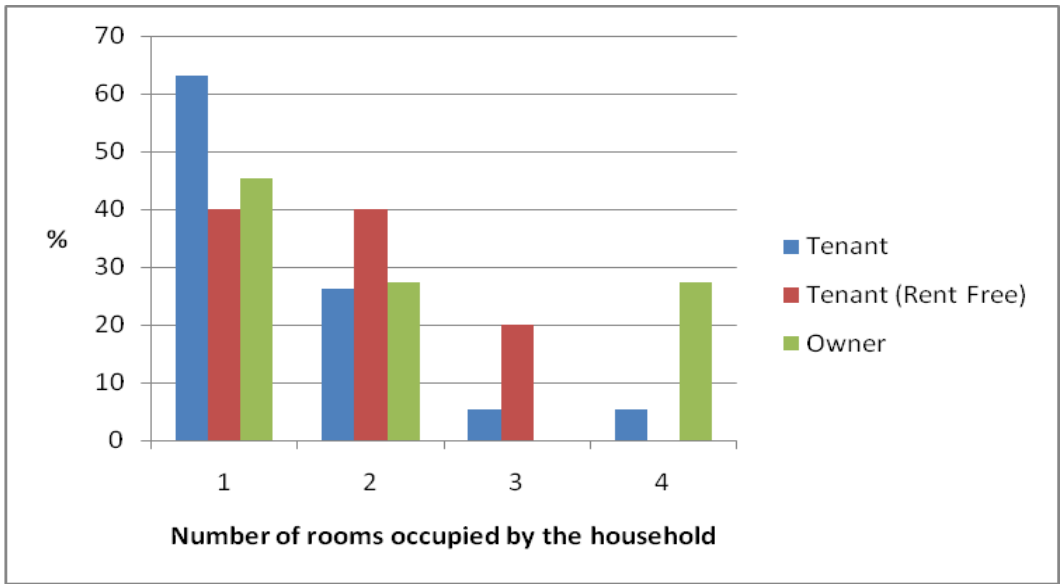
Habitable Space in a dwelling includes bedrooms, dining and living rooms, but not kitchens, bathrooms, toilets, balconies, verandahs, passages, storages, commercial spaces and open spaces. Habitable space in Ghana includes halls, where the name 'chamber and hall' is used for living rooms (Tipple 2000).

Chart 15: # of rooms occupied by the household



Source: Author's household surveys, July 2010

Chart 16: # of rooms occupied by the household with respect to tenure status



Source: Author's household surveys. July 2010

From the chart above, it could be said that, among three tenure status groups in the survey, tenants are the group that usually occupy less rooms than rent free tenants and owners. This is in line with findings of Tipple (1987) who have concluded that owners tend to occupy more rooms than tenants, while rent free tenants, who are the members of extended family of owners, occupy more rooms than tenants, but less than owners. No comprehensive correlation existed in between the household size and the number of the rooms occupied, as would be expected in an equitable society having an adequate housing stock (Tipple 1987).

64% of the households reported house related health threats. The most common health threat was malaria because of the open gutters around. Diseases like cholera and diarrhoea related to the unsanitary conditions of shared toilets, public toilets, open gutters and refuse dump were also mentioned. Contagious diseases for too many people sharing the same sleeping space and stress related psychological disorders because of overcrowding and lack of privacy were also mentioned by respondents.

For key informants from the local government compound houses were habitable only in the sense of protection from the weather conditions. They claimed that compound houses were only better than depending on someone for a place to live in, that they were chosen for affordability, but not for habitability.

Key informants from both local government and the university mentioned the necessity to transform compound houses into self-contained units for households. Their point was that shared use of facilities in the earlier times, when the compound was inhabited by one extended family was not causing problems, but since compounds were now inhabited by a mix of owner and tenant families, former discipline of sharing facilities was broken, causing tension and conflicts among households.

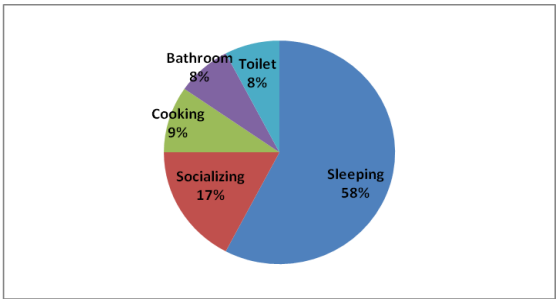
For the traditional authority, the Chief of Zongo, compound houses were not habitable mostly because of lack of privacy. For him quarrels, fights and bad peer influence for the children and youth made the life in compound houses undesirable. He thought compound houses were not a right place to bring up children.

Structural hazards existed in the compound houses in Ayigya, due to the old age of the houses and lack of proper maintenance. Foundations of the compound houses were exposed due to erosion, there were cracks in the walls and windows and doors were not well fitted anymore. Some of these structural hazards were dealt by inhabitants in temporary self-help ways like filling in the cracks in the walls with mortar. Nevertheless lack of proper maintenance might create more serious problems in the future.

4.4.1 Overcrowding

Almost all the households expressed the need for more rooms, primarily for sleeping (58%), socializing (17%), kitchens (9%), bathrooms and toilets (each 8%) (Chart 17). Although the need for proper facilities was a major outcome of the household survey, the fact that most of the households needed more bedrooms, instead of facilities, point out to a major problem: overcrowding. Overcrowding is therefore stated most commonly by the respondents as a reason for both conducting an improvement (an extension) and a reason to move from the house.

Chart 17: Purpose of the needed rooms

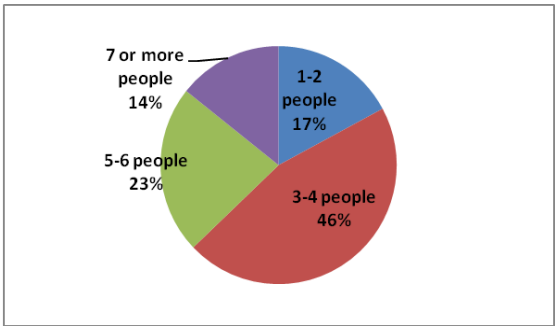


Source: Author's household surveys. July 2010

More than half of the households in compound houses in Ayigya that occupy one single room had more than 6 people. Nevertheless, rent payment capacity for tenants, or possibility to occupy more rooms for rent free tenants and owners, rather than the size of the household seemed to be the determinant of the number of rooms occupied. This is in line with Tipple (1987) who commented that, an adequate housing stock would create a flexible housing market, where large households have the option to occupy sufficient number of rooms within acceptable occupancy rates even when they make compromises on quality of services (Tipple 1987). The dominance of the households occupying a single room, presents a serious shortage of accommodation units. As a result households often suffer from overcrowding.

According to the UN definition of the sufficient living area compound houses in Ayigya fall short. First of all, occupancy rate which is 4.3 persons per room is higher than the UN standard of three persons per room. It is also higher than the occupancy rates of single storey compounds in the previous studies. Tipple (1987) states occupancy rate for indigenous sector as 3.5, and Van Donkelaar & Van der Laan (1994) as 3.1, which might be a regional difference in city of Kumasi, but it might as well be a result of densification[16] in single storey compound houses that took place in time. Second, a very significant proportion of rooms in compound houses in Ayigya (83%) are shared by more than three persons for sleeping. A considerable percentage of the rooms are shared by 7 or more persons (14%), representing the extreme scale of overcrowding problem (Chart 18). And third, there is very high proportion of households occupying only one room. In these rooms, parents, children and other dependants share sleeping space which is often partitioned only by curtains highlighting privacy problems in addition to overcrowding.

Chart 18: # of people sleeping in the same room



Source: Author's household surveys, July 2010

Box 4: Sufficient living area

Sufficient living area is a key indicator for measuring the adequacy of a shelter. Overcrowding results in reduced space per person, which creates different categories of health risks. Reduced space per person is a key criteria to define a slum. Overcrowding indicates high occupancy rates, low floor areas per person and high number of persons sharing one room, and a high number of households occupying single room units. In most slums around the world, often dwelling units are overcrowded as a result of accommodating five or more persons sharing a one-room unit for sleeping, and other daily activities. Households with three persons or more per room, is an indicator of overcrowding, where a room is defined as an enclosed space, large enough to place a bed for an adult (at least four square meters) in a housing unit or other living quarters (UN-HABITAT 2003a).

[16] Continuous densification of the compound houses is mentioned in RICS (2006)

4.4.2 Lighting and ventilation

Although only two respondents out of 35 have mentioned about their dissatisfaction about the windows for being too small to get enough daylight, and for ventilation, lighting and ventilation in compound houses are far from satisfactory. In some compounds extensions on the outer walls have eliminated windows, or some windows were completely eliminated by users for security reasons, leaving the doors as only openings for daylight and ventilation which was not sufficient. Elimination of the windows or very small windows worsens the lighting and ventilation condition of the rooms.

4.4.3 Moving and/or improving

Sinai (2001) argues that housing satisfaction and quality together with the household characteristics influenced the decision to make a housing adjustment such as moving and improving.

Majority of the respondents (82%) (Chart 19) reported that they would like to improve the house, which meant extending, renovating or rehabilitating the house. Reasons of improvement included replacement of old materials with new and more resistant ones, need for more space, need for privacy, need for a self-contained house, need for a hygienic, clean and good house and the need for adequate facilities.

Improvement to be conducted is mostly adding more rooms to the house. Most of the rooms to be added were bedrooms, but adding kitchen, bathrooms and toilets were mentioned too. Building a larger living place, another storey, rooms for guests, a place for cattle, constructing a proper ceiling, plastering the walls, repairing the walls, cementing the floor of the courtyard, changing the roofing and windows, painting the house and constructing a drainage system were among the improvements planned.

Majority of respondents (77%) (Chart 20) considered moving from the house because it was too crowded, congested, they needed more rooms, they needed to start a new family in a self-contained house, they were not satisfied with the house, there was tension and conflict between households, they did not want to share the house, they needed privacy, peace of mind, and a better life in a spacious place.

Chart 19: Improvement plan about the house

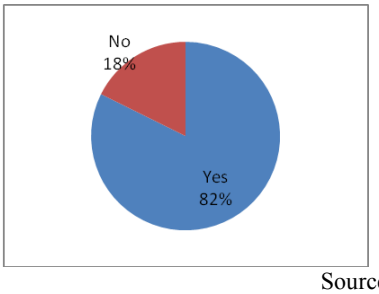
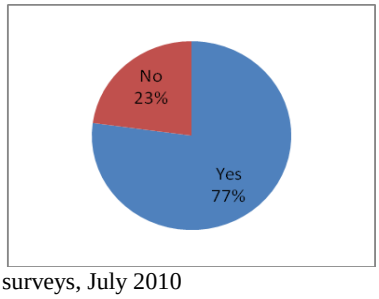


Chart 20: Movement plan from the house



Source: Author's household surveys, July 2010

4.5 Accessibility

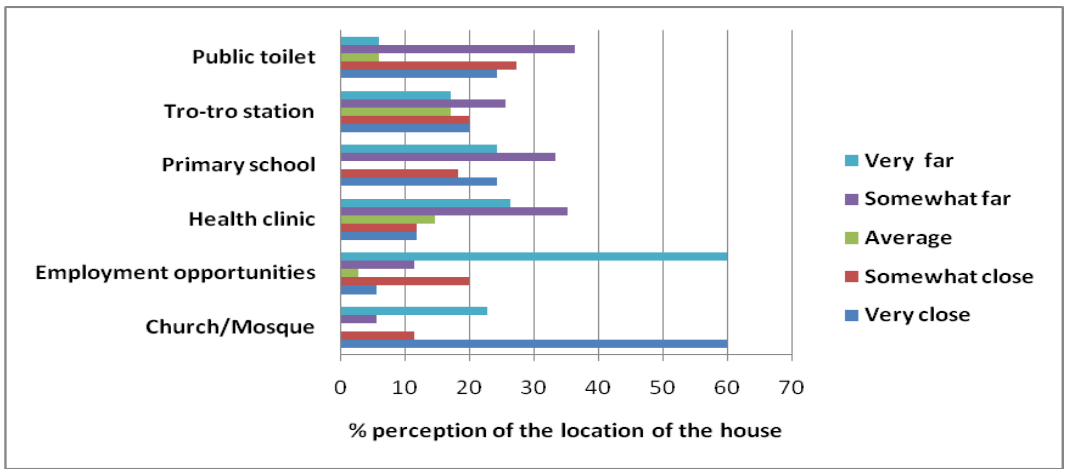
When accessibility by the disadvantaged groups is considered, compound houses in Ayigya are most accessible by the low income groups. An exception to this might be the undefined status of the rent free tenants in case of the death of the actual owner. The new owner might ask them to pay rent or leave the house. This issue although it affects only 6% of the whole tenants might be considered as an accessibility problem.

Otherwise, there are no restrictions for accessibility of disadvantaged groups, but at the same time there are no laws and regulations in Ghana to ensure priority of the disadvantaged groups in accessing adequate housing. Nevertheless it is possible to say that life in compound houses present more challenges to the disadvantaged groups. Lack of proper services and facilities, especially the need to use public toilets make lives of the children, the women, the elderly and the disabled more difficult. It was mentioned by a considerable amount of respondents and stated in Tipple (1999) that certain daily activities like fetching water and dumping refuse are traditionally expected from children.

4.6 Location

According to the location criterion of the right to adequate housing proximity of a house to various public facilities and employment opportunities are among the indicators to make the location of the house adequate. On the other hand, a house must be located relatively far from the pollution sources to be considered adequate (UN-HABITAT 1996; UN-HABITAT 2003b).

Chart 21: Location of the house with respect to facilities



Source: Author's household surveys. July 2010

The household survey revealed that 46% of respondents found public toilets far from their houses. Another 43% of respondents found tro-tro stations far. Primary schools were far for 57% of respondents and health clinics were far for 61%. 71% of the respondents thought employment opportunities were far from their houses. The most convenient facilities to reach were the church and the mosque, which were only stated as far by 29% of the respondents (Chart 21).

On the other hand, for 51% of inhabitants there were pollution sources around the house. Public toilets, open gutters, refuse dumps, smoke from the charcoal were reported as pollution sources. Noise was also mentioned among pollution sources.

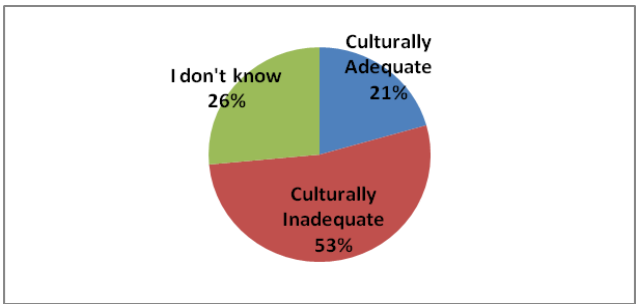
Informants from the local government reported that location of the compound houses in Ayigya used to be convenient to reach educational, health, and religious facilities, public toilets, transportation stops and employment opportunities. In time, with the expansion of the settlement some houses on the peripheries were no longer close to certain facilities, transportation stops or employment opportunities.

Location of the compound houses in Ayigya was problematic both for being far from the public facilities and employment opportunities and for being close to pollution sources.

4.7 Cultural adequacy

Only 21% of the respondents reported that compound houses are culturally adequate for them, on the other hand for 53 % of the respondents' compound houses were culturally inadequate (Chart 22).

Chart 22: Cultural adequacy of the compound house



Source: Author's household surveys. July 2010

Respondents who were positive about cultural adequacy reasoned their choice by saying that the communal life in the compound houses made it possible for them to know their family members and socialize with them. Some Muslim respondents mentioned the possibility of learning religious requirements from each other through communal life. Some respondents thought compound houses were culturally adequate because they offered a strong sense of security and trust. Other respondents stated that compound houses by accommodating grandparents, children and in-laws, fostered an indigenous way of life.

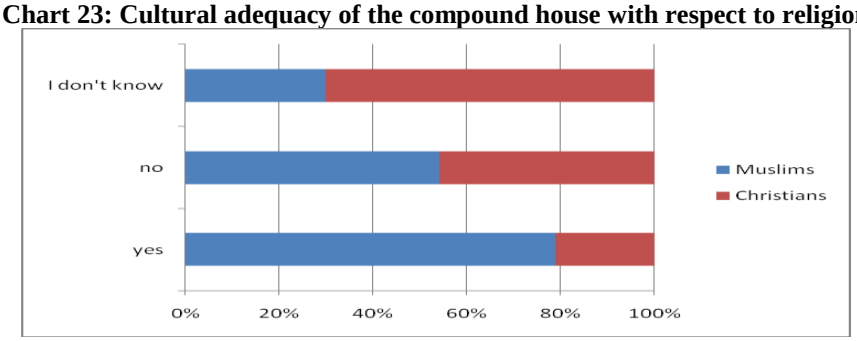
Compound houses were suitable for the extended family which is an important feature of the Ashanti life. Providing rooms for all the members of the family implied cultural adequacy thus compound houses were referred as 'family

houses'[17]. In family houses, members of extended family had a right to stay in the house without paying rent. Moreover, when members of the extended family needed a room in a family house in the city, they were often given one, as a traditional responsibility of the owners, even when this required moving out of a tenant (Van Donkelaar & Van der Laan 1994)

For more than half of the respondents compound houses were culturally inadequate. Main reasons given for the cultural inadequacy included quarrelling and fighting among households, children making noise, lack of respect, lack of privacy, rooms being too small to accommodate families with children, peer pressure for adolescents, and being close to people with different lifestyles which are considered improper.

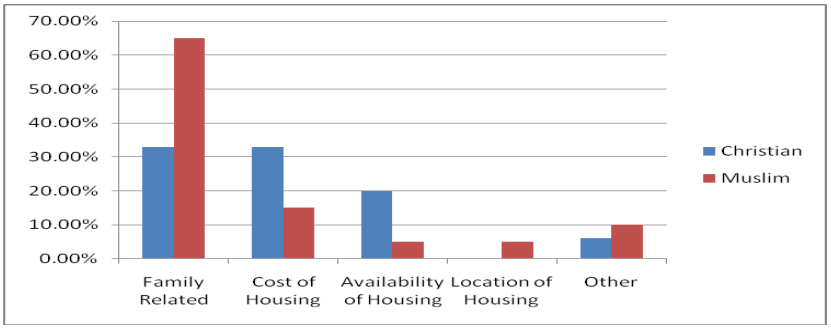
Although more than half of the respondents stated that compound houses were culturally inadequate, there is a remarkable difference between Muslims and Christians who thought compound houses were culturally adequate. Muslim households tended to perceive compounds more adequate than Christians (Chart 23). This might be explained by Muslims being more inclined to communal life and giving more importance to family when compared to more individualistic Christians. Other evidence to support this assumption can be traced in a comparison of reason for living in Ayigya with respect to religion (Chart 24).

Chart 23: Cultural adequacy of the compound house with respect to religion



Source: Author's household surveys, July 2010

Chart 24: Reason for living in Ayigya house with respect to religion



Source: Author's household surveys, July 2010

[17] David Korboe (1992) in his article *Family-houses in Ghanaian Cities: To Be or Not To Be?* discusses rent-free housing consumption in Kumasi, where one-quarter of all households occupy free accommodation associated with the communal ownership and use of the house by the extended family.

Key informants from the local government stated that in the earlier times, considering the first generation to build the houses and the second generation, their children lived in harmony in compound houses. But in time, with changing behaviours and values third and fourth generations are disintegrated from the earlier generations which cause fights and quarrels in the communal life. Also the communal life which required the responsibility to clean shared facilities and pay the part of the common bills brought conflicts. Compound houses no longer accommodated only extended families, but they accommodated tenants as well. All these factors contribute to communal life's dying out, which meant cultural adequacy of the compound houses is not so strong anymore.

While local government officials stated that communal life offered by compound houses was not popular anymore, especially for the youth, professors from KNUST argued that compound houses were built on Ghanaian culture, they had strong ties with the tradition therefore, they were culturally adequate. Professors mentioned that one person well off in the family built a compound house with rooms which could bring or keep the family together. Discipline in a compound house is maintained by the head of the house and the elderly, and orphans are looked after in the compound. They added that compound houses still had strong links with the communal African life and they were culturally adequate even when there was a shift in the culture from the extended to the nuclear family.

Although the culture of extended family living together in a family house is still strong, especially young people seem to be preferring a self contained house of their own where they could have a peace of mind. This is a remarkable divergence from traditional way of life, which was already noted in studies by Van Donkelaar & Van der Laan (1994), RICS (2006), Afram (2007), Afram & Korboe (2009).

Chapter 5: Conclusions and recommendations

Chapter five highlights the major findings of the study and provides answers to the research questions. The reflections of the findings in the current literature are also presented in this section, defining the relation of the study to the existing body of knowledge. Strengths and weaknesses of the study are evaluated stating future research opportunities. Finally conclusions are presented in the last section.

5.1 Findings of the Research

The main research objective of this study was definition of spatial and technical improvement of the compound house as to satisfy criteria of adequate housing and description of the policy environment to enable its provision as an adequate low income housing option. It required revealing inhabitants' perceptions, aspirations and needs concerning the compound house as well as discussing its relevance as an adequate housing option considering inhabitants' perspectives with respect to right to adequate housing.

Criteria of right to adequate housing are used to classify findings in order to answer each research question. Reflections of findings in the current literature are presented within discussion. Conclusions and recommendations on possible spatial and technical improvements to make single storey compound houses satisfy the criteria of right to adequate housing, and the policy environment to enable provision of them as an adequate low income housing option are outlined.

5.1.1 Perceptions, aspirations and needs of the compound house inhabitants in Ayigya concerning criteria of the right to adequate housing

Legal security of tenure

Majority of the compound households had a perceived security of tenure owing to customary land rights although most of them did not have statutory titles. Only a small proportion of tenants and rent-free tenants, constituting 9 % of the whole households reported eviction threat from landlords.

Availability of services, materials, facilities and infrastructure

Availability of services such as water supply, cooking energy and electricity, building materials, facilities such as kitchen, bathroom and toilet, and infrastructure such as drainage and refuse disposal in compound houses in Ayigya present a major challenge. There is a considerable level of dissatisfaction for most of the components of this criterion namely: water supply, use of charcoal, deterioration of building materials due to poor maintenance, shared use of facilities, lack of proper facilities, obligation to use public toilets, lack of proper drainage system and malfunctioning of refuse dumps.

Affordability

Cost of housing was the second most common reason to live in Ayigya implying affordability. Nevertheless most households, especially tenants spent more than half of their income on housing related expenses. It is possible to say that compound houses seem to be more affordable for owners and rent-free tenants, than tenants.

Habitability

Habitability is the other most problematic feature of the compound houses. Overcrowding as the most significant habitability problem has consequences such as high occupancy rates, privacy problems connected to high occupancy rates, and overloading of services and facilities. Habitability problems and dissatisfaction with services, materials, facilities and infrastructure lead to housing adjustment decisions and plans like improving and/or moving.

Accessibility

Accessibility of the compound houses by the low income population as a disadvantaged group in the society is relatively high when compared to the other forms of housing. Accessibility problems exist only for rent free occupants in the instances when the owner of the compound dies and the new owner wants them to pay rent or does not want rent free tenants at all.

Location

Location of some compound houses in Ayigya is problematic regarding proximity to public facilities, transportation stops and more significantly to employment opportunities. In addition, proximity to perceived pollution sources that is open gutters, public toilets and refuse dumps also creates problems.

Cultural adequacy

Cultural adequacy of the compound houses is a complicated issue, presenting contradicting perceptions, aspirations and needs. Although prevalent perception of cultural adequacy is negative, considerable rate of positivity about cultural adequacy cannot be ignored.

5.1.2 Capacity of the compound house to satisfy the criteria of the right to adequate housing

Compound houses in Ayigya have varying degrees of compliance in relation to the different components of what constitutes adequate housing. Evaluating some criteria was complicated due to conflicting and contradicting perceptions, aspirations and needs of the inhabitants and opposing views of different authorities and various reflections that can be found in the literature.

Legal security of tenure

Legal security of tenure is a rather satisfactory aspect of the compound houses in Ayigya, ensured mostly by customary rights related to land and housing. Eviction threat disturbs only a small proportion of tenants, which is also confirmed by views of local government officials, academicians and the traditional authority. In Kumasi, eviction threat existed only for houses that were built on water courses, main roads and land reserved for public facilities but this did not apply to Ayigya, where there were compound houses built on secondary roads. So far no eviction threat existed for those houses. Although legality of tenure in terms of statutory and customary rights, and possible overlaps are major research subjects, security of tenure in terms of existence of threat of eviction has little significance in the literature on compound houses in Ghana[18]. Though, it is important to note that, some rent-free tenants, who were the members of owners' extended family reported disturbance from the new owners after the death of an actual owner, which contradicted the social convention of the culture to give owners the responsibility to accommodate the members of the extended family.

Availability of services, materials, facilities and infrastructure

Compound houses in Ayigya have significant deficiencies in terms of availability of services, materials, facilities and infrastructure. Provision of services, like water supply, cooking energy and electricity are problematic. Building materials are usually old and deteriorated. Facilities like kitchens, bathrooms or toilets are non-existent or have serious deficiencies. Infrastructure such as drainage system and refuse disposal is far from satisfactory. Findings of the study confirm that, the problems in this aspect of the housing condition as diagnosed by previous studies by Tipple (1987), Van Donkelaar & Van der Laan (1994), Tipple (1999), and Konadu-Agyemang (2001) are still valid and even more severe.

Affordability

Affordability seems to be a positive aspect of compound houses especially for owners and rent-free tenants. It is important to note that majority of the households, generally tenants spent more than half of their income on housing when they were willing to spend less. Nevertheless affordability is a promising feature of the adequacy of compounds, since cost of housing was a common reason to prefer Ayigya for living. Affordability of the compounds was confirmed by academicians, local government officials and the traditional authority although each group had their own reservations on the issue. They argued that affordability of the compounds as a positive aspect came with the compromises on other features like shared services. Their comments were in line with discussion on affordability of the compounds in the literature in studies by Afram (2007) and Afram & Korboe (2009). Affordability of the compound houses is highly

[18] Konadu-Agyemang (2001) mentioned, not eviction threat but harassment from landlords to tenants in his discussion on dissatisfactions about the housing conditions in Accra.

promoted in literature, although the features to provide affordability, themselves, like shared facilities might be problematic.

Habitability

Extreme levels of occupancy rates due to overcrowding point out to a serious incapacity of the compounds in terms of habitability. But the problems associated with habitability are mostly caused by the general housing shortage in the city, which severely affects the low income population in compound houses causing densification and congestion of the existing houses, which are rather affordable and accessible for them.

Accessibility

Accessibility of the compound houses in Ayigya for the low income population is rather satisfactory. The inhabitants of the compound houses were mostly from the low income bracket, and they had an access to the compound houses, in spite of the low standards of living they had, and the proportion of rent they had to pay. Incidences of accessibility problems were rather low (6%) affecting inhabitants from a specific tenure status: rent free occupants.

Location

Location of the compound houses in Ayigya has problems in terms of being far from different facilities and employment opportunities, and being close to pollution sources. Proximity to pollution sources since pollution sources are identified as public toilets, open gutters and refuse dumps, is one of the consequences of inadequacy of the facilities and infrastructure, therefore connected to the incapacity of the compounds to meet the adequacy criteria on them.

Cultural Adequacy

Assessing cultural adequacy of the compound houses in Ayigya is complicated due to contrasting perceptions, aspirations and needs of the inhabitants on cultural adequacy. Although dominant view is the inadequacy due to the changing norms of the culture, there are aspects which imply cultural adequacy for a considerable proportion of the inhabitants. These views on adequacy of the compound houses are not negligible and they might have significant implications on spatial and technical improvements and policy options. Demographic changes like nuclear families becoming dominant over extended families make the cultural adequacy of the compound houses questionable. On the other hand there is a strong connection between religion and cultural adequacy of the compound houses that, for most of the Muslim population compound houses are favourable in terms of the communal life they accommodate.

5.1.3 Spatial and technical improvement of the compound house

Availability of services, materials, facilities and infrastructure

Improving water supply in Ayigya requires the expansion of the piped water distribution. In addition existing pipes and connections need maintenance and repairing. Use of LPG instead of charcoal has to be encouraged. Quality of the electricity supply has to be improved. There is a need to encourage use of separate electricity meters to make low income population living in compounds benefit from the subsidized tariffs. Deteriorated and old building materials need serious maintenance such as replacement, renovation and rehabilitation. Facilities like kitchens, bathrooms and toilets have to be maintained properly and improved. Once use of LPG is encouraged, it will be easier to provide households with private kitchenettes. Then there might be a need to keep the traditional shared kitchens available solely for the communal preparation of traditional foods, limiting the use of charcoal for such activities. Condition of public toilets has to be improved. A more advanced system of drainage than open gutters has to be installed. Condition of the roads has to be improved. Problems of the refuse disposal should be solved until a more advanced system of refuse disposal is introduced.

A comprehensive upgrading programme could be designed and implemented to improve the compounds regarding services, materials, facilities and infrastructure. Community could be directed into CBOs which can act as a driving force to facilitate implementation of the programme. Capacity building workshops can be designed for the community to increase their awareness on use of alternative cooking sources, explaining that use of LPG could be more economic than charcoal after initial costs of acquiring the LPG cylinder, stove and subscription are met. Community should also be informed about advantages of using separate electricity meters and subsidized tariffs. Community workshops could include short term practical educations on installation and repair of the water pipes, closed gutters, simple building techniques and the use of building materials. After this capacity building, upgrading programme can be implemented on a community-help basis with the assistance and technical guidance of KNUST, under the supervision of KMA. A multi-actor committee, with the participation of the chiefs, the assemblymen, community leaders and other representatives could be responsible for monitoring the implementation.

Habitability

Regarding habitability, there is a significant need to increase the number of rooms per family in the compound houses in Ayigya. Overcrowding of the compound houses has to be solved. Occupancy rates of the rooms of the compound houses should be withdrawn within the range of acceptable standards.

Since overcrowding is not a problem specific to compound houses but is an outcome of the general housing shortage and poverty in the city, there is a need to

promote affordable low income housing schemes for the whole city of Kumasi to improve the habitability significantly. Therefore, increasing the capacity of the households to afford better accommodation is crucial.

Facilitating construction of new affordable compound houses and assisting the extension activity in the existing ones might increase the habitability of the compounds. Abolishing outdated and unrealistic building regulations and legislations, thus simplifying the process to get building permits might contribute to encourage more people to build houses.

The affordable low income housing schemes should include options promoting incremental development. Incremental construction or extension of houses should make it possible for the households to develop their houses into self-contained units in time. In fact the layout of the compound house is suitable for this kind of incremental extension activity, which is already being practised by the process of converting verandas to kitchens or rooms (Figure 14). What is needed in this sense might be a pre-designed extension procedure, which might be facilitated on site by technical assistance, satisfying user preferences. This incremental growth of the houses should enable the occupation of the initial rooms, while the next phases are in construction. At this point it is important to ensure at least shared services and facilities are available at the early stages of construction and occupation. Incremental development might help to make traditional compound house layouts into new compound houses of self-contained units that allow multi-habitation.

Figure 14: Open verandas and closed verandas

Source: Author, July 2010

Encouraging construction of multi storey compounds or promoting construction of second floors as vertical extensions for existing compounds might also help to ease the problem of overcrowding, though there might be cost implications due to necessity of requiring high technologies, high standard building materials and qualified workmanship.

In addition, the improvement in services, materials, facilities and infrastructure will eventually contribute to improve the habitability of the compound houses.

Cultural adequacy

Providing enough habitable space to ensure privacy could be a priority in strengthening cultural adequacy through spatial improvements. Provision of extra bathrooms and toilets for separation of sexes when desired by the households would also improve cultural adequacy. This might be necessary especially for Muslim households. Redesigning compound houses into units to satisfy user preferences is essential in this sense. They might be evolved into residential complexes of self contained units satisfying needs of the households who would like to have more privacy. This would be easier when problems with services, facilities and infrastructure are solved, since having a private bathroom or a toilet creates problems, when piped water supply or proper drainage is non-existent. On the other hand, quality of the common spaces like courtyards and kitchens can be improved to satisfy the needs of the households that enjoy the communal life the compounds offer. The important point is that these alterations should not sacrifice the basic positive features of the compound houses.

5.1.4 Policy environment to enable provision of the compound house as an adequate low income housing option

Legal security of tenure

Although legal security of tenure is more or less a satisfactory aspect of compound houses in Ayigya, it is important to take preventive measures to avoid the issue from becoming a problem. Statutory and customary land and housing rights should be made clear to the inhabitants and documents to prove security of tenure should be provided to them. This might require capacity building in the community and formation of a CBO to ease the legal process. One policy option to improve this situation could be clarifying the tenancy rights of the rent free tenants. The procedure to be followed in case of unavoidable evictions and measures to protect and compensate evictees should be explicitly defined.

Availability of services, materials, facilities and infrastructure

Improvement of water supply should have a priority in the upgrading programme since it has implications on general wellbeing of people for health, productivity and cleanliness. Water provision and related infrastructure could be subsidized, and community participation should be facilitated in the expansion of the system with participation of the private sector, under supervision of the related department of KMA.

Promotion of LPG instead of charcoal might require intermediate systems, like the use of both in the transition period, which might help to reduce negative effects of use of charcoal. Reduction of the initial costs of LPG cylinder, stove or the payment for subscription and/or possibility to pay in instalments should be provided as measures to encourage LPG use.

Standards and measures for the electricity supply have to be defined to improve the quality. Measures have to be taken to promote the use of separate meters to make the low income compound house inhabitants benefit from the subsidized tariffs. This would also help to ease the conflicts and tension about the payment of common bills, which is one of the most common problems about the shared services.

Roofing and walling materials and windows and doors of most compound houses need renovation or repair. Subsidized provision of basic, most common, easily and locally available and affordable building materials should be promoted. Micro finance schemes specifically designed for compound houses should be introduced. Improvements to be conducted on facilities of the compounds also should be included in the microfinance schemes.

Creating a working drainage system should also be a priority in settlements like Ayigya; therefore it should be one of the most important aspects of the overall upgrading programme. Community could be organized to install drains along the roads and to build proper roads under the supervision of the related department of KMA. Community could contribute to provision of the materials and labour on a communal basis, while KMA coordinates the work and provides technical assistance. It should also be responsible for the maintenance of the installed drainage system since initial coats of materials and labour are shared by the community. Community can be organized to participate led by the chiefs, local leaders and the assembly men. The programme could be implemented on a road to road basis.

Policy options regarding availability of the services, materials, facilities and infrastructure require enablement compound house inhabitants with the innovative and targeted subsidies and finance for all of the aspects of the criteria supported by the participation of multiple actors including community, under the supervision of the government actor.

Affordability

Improving affordability of the compound houses for builders requires abolishing outdated and ineffective regulations on land acquisition, land development and housing design and construction, simplifying the processes of obtaining necessary permits to start building a house.

Provision of serviced plots, smaller than the current regulation permits might lower the costs for potential home owners. On these smaller plots compound houses of smaller sizes, having less rooms could be built. This would not only lower the construction costs but also reduce the overloading of services and facilities thus decrease the tension related to sharing them.

Encouraging the use of local traditional building materials, which are currently prohibited in urban areas, both for building new compound houses and extending

the existing ones might help to improve the affordability. This could be a viable policy option, since Konadu-Agyemang (2001) in his study about *Housing conditions and characteristics in Accra*, and Yeboah (2005) in his article *Housing the urban poor in twenty-first century Sub-Saharan Africa: Policy mismatch and a way forward for Ghana* suggest that under proper maintenance, traditional materials like swish, adobe, mud and bamboo are very durable and resistant.

Innovative tenure systems like communal ownership for the house and the land (leasing of the land) should be explored to improve the affordability of the compound houses. Communal ownership would be very convenient for compound houses since they already offer multi-habitation possibilities. Multi-habitation possibilities should also be considered for provision rental housing. However there is a necessity to make rental income an encouraging factor. Incentives are essential for encouraging the private sector to provide rental compound houses for the low income.

Incremental development as a potential to improve the efficiency of the construction of houses in pre-planned phases should be considered for affordability. This might enable owners to build in smaller and cheaper phases, reducing the time lag between the investment and occupation.

Habitability

One of the regulatory constraints that hinder building new compound houses is the assessment of the courtyard space in a compound house as built up area not an open area (Tipple & Korboe 1998). Abolishing regulations like this that hinder housing provision without helping to achieve an evident improvement in services, safety and health, would encourage more low income people to build houses.

Housing adjustment decisions like moving or improving, since they figure out the need to improve housing conditions as to satisfy habitability comprehending their determinants are important to formulate related policy options with legitimate targets. In line with Sinai (2001), implication of residential mobility requires policy options like provision of affordable housing and sites and services programmes. If tendency for improving the house is more prevalent than residential mobility other policy options like upgrading and the provision of credit for home improvement might be more viable.

In Ayigya, there is almost an equal preference for residential mobility and improvement even though they are both significant. For improving housing conditions and providing acceptable room occupancy rates, government can encourage housing adjustments by reducing the costs involved in both moving from the house and improving the house. Reducing the cost of building new houses and extending the existing houses would help to achieve acceptable room occupancy rates. In this case government shifting its focus from promoting single family houses to the traditional compound houses would help to channel funds to low income housing as it would provide houses for more people with the same amount of funds. This would require changes in building regulations in a way to make it easier to get a building permit for new compound houses and extending

the existing ones. Introducing financial mechanisms to provide credits to encourage building of new compound houses and extending the existing ones would also help to increase the habitability of the compound houses. If these policies result in more households occupying more than one room, many households in Ghana would have better living conditions.

Accessibility

A shift of the government policy from stressing formal sector housing provision to an approach that enables pluralistic involvement in housing provision with both formal and informal private sectors, the public sector, NGOs, CBOs, community itself and the individual builders would increase the accessibility of the low income population to housing in general. The efforts of the low income community and the low income builders are significantly important in this sense since they are mostly inhabitants of the compound houses. Their labour can be converted to assets through self-help, self-build, extended family-help, or community-help as Yeboah (2005) recommends.

Measures taken to assure affordability would eventually increase the accessibility of the low income groups to housing. Micro finance schemes and encouraging community savings groups are important at this respect. Directing low income groups into self-help CBOs or community savings groups might increase accessibility to adequate housing by assisting them to obtain plots to build or find rooms to rent.

Location

Location of the compound houses in Ayigya can be improved by policies that promote social infrastructure, create employment opportunities, and develop transportation network in Ayigya. Reduction or removal of pollution sources is also important for improving the quality of location. In this sense community participation to improve services, materials, facilities and infrastructure might be very relevant to have a better settlement free from pollution sources.

Cultural Adequacy

Compound houses should be adapted to the demographic changes in the culture such as nuclear families becoming dominant over extended families. Increasing demand for nuclear families and houses for more individualistic life styles might necessitate provision of smaller compounds or self-contained units in compounds.

Considering the unavoidable need to rent out rooms in a compound, to households other than the members of the extended family, as in the present day Ayigya, facilities reserved for their use should be provided, since shared use of facilities cause trouble among households. These alterations in the traditional compound form should not compromise its affordability as a low income housing option.

There is a need to develop new forms of housing inspired by the advantages of compounds such as being flexible, low cost, convenient for outdoor cooking,

allowing multi-habitation but at the same time fitting into new perceptions of acceptable housing in urban life. Although there is a tendency among the compound house inhabitants to prefer modern self-contained units of housing, compound houses will continue to be the housing options for the migrants coming to the city who would depend on kinship relations and the extended family for coping with the difficult urban life as Afram (2007) suggests.

Improvement of the housing situation in Ayigya depends on implementations including improving the quality of existing housing stock and formulating policies and strategies to promote affordable housing which can be accessible by low income groups in the city of Kumasi. This requires co-operation of the government, private sector, NGOs and the community.

5.2 Research strengths, weaknesses and a way forward

The UN definition of the adequate housing and criteria of the right to adequate housing have provided a very useful guide for the research from building a conceptual framework to pointing out the essential points in the literature review.

General household survey conducted by Ghana Atelier team, covering more than half of the houses in the research area with 180 households has given a comprehensive understanding of the research area in terms of population, housing and household characteristics. General household survey helped to formulate valid points to investigate in in-depth interviews and in the second survey conducted on the adequacy of the compound.

This research tested findings of the previous studies on housing conditions in other neighbourhoods of Kumasi, in Ayigya. It mostly verified and consolidated them, and contributed to the discussion on describing the instances contradicting them. Therefore, it adds to the on-going discussion on promoting the encouragement of compound houses as an urban low income housing form. Different from the previous studies which have presented their advantages and disadvantages, this study has evaluated the compound houses in terms of adequacy as a low income housing option.

Findings of the research apply not only to Ayigya, but probably to most of the single storey compound house neighbourhoods in Ghana since single storey compound houses are typical low income accommodation forms throughout the country, though severity of the problems might differ according to settlements.

This research is basically an evaluation and assessment of the existing situation of a vernacular form of housing. Therefore its validity depends on its ability to inspire new studies and to give insights for actual implementations on both physical improvements and policy options.

Further studies on the promotion of compound houses as adequate low income housing options might include;

-Exploration of factors which determine the decision to build a new compound house.

-Comparison of compound house neighbourhoods and single-family house neighbourhoods in terms of physical and social infrastructure.

-Tenure security for the rent-free tenants in compound houses with respect to changing perceptions of culture.

5.3 Conclusions

Compound houses in Ayigya are generally inadequate both in quantity and quality for growing population and for changing demographics, values and family culture. Compound houses in Ayigya are currently satisfactory in terms of legal security of tenure. Possibility of being built inexpensively and incrementally makes them affordable and accessible for the low income groups. If the measures to improve them in terms of habitability, services, facilities, infrastructure and maintenance can be taken and implemented, they can satisfy most criteria of the right to adequate housing. There is an apparent need to rethink and revise the compound houses in terms of cultural adequacy regarding user preferences, rather than discouraging their provision totally.

To describe the real situation of low income households living in the compound houses, it is crucial to get a detailed grasp of their perceptions, aspirations and needs connected to it. This is the essence of formulating better improvement and policy options, since without the participation of the community any attempt to change the situation for better might fail. Besides, there is a need to update this information on perceptions, aspirations and needs of the inhabitants, since it is inevitably subject to change in time. The needs could be more severe and urgent in the present day when compared to past, contradicting expectations, and change in perceptions and aspirations could be deeper than they are anticipated in the literature.

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Annex 1_ Compound specific household survey questionnaire

INSTITUTE FOR HOUSING AND URBAN DEVELOPMENT STUDIES (IHS) GHANA ATELIER HOUSEHOLD SURVEY ON ADEQUACY OF THE COMPOUND HOUSES IN AYIGYA

The purpose of this household survey is to gather data on adequacy of the compound houses through responses of the compound house inhabitants in Ayigya, as part of a research work for the master program in IHS, Rotterdam. The results of this survey shall be used solely for academic purposes.

A. Respondent Info

1. Age :
2. Gender: (1) Male (2) Female
3. Religion: (1) Christian (2) Muslim (3) Other
4. Number of Households in the house:
5. Total number of rooms in the house (exclude kitchen, bathroom and WC):
6. Number of respondents household members :
7. Position in household :
8. What is the household configuration?
   (1) Single person (2) Nuclear family (3) Extended family (d) Other:
9. Level of education:
   (1) University and above (2) Secondary/High school (3) Junior high school
   (4) Primary school (5) Not finished primary school (6) No education
10. What is your reason for living in Ayigya?
    (1) Family related (2) Cost of the housing (3) Location of the housing
    (4) Availability of housing (5) Other:

B. Legal Security of Tenure

11. What is your tenure status?
    (1) Tenant (2) Tenant (rent free) (3) Owner

12. Are you experiencing threat of eviction?
    (1) Yes (2) No

13. If yes, from whom?

C. Availability of services, materials, facilities and infrastructure
C.1. Services

14. What is your main source of drinking water?
    (1) Piped water (2) Public tap (3) Water from neighbour

(4) Water from private vendor (5) Other:

15. If main source of drinking water is piped water, how many hours per day do you
have water?

16. Are you satisfied with your current water source?
(1) Very satisfied (2) Somewhat satisfied (3) Neutral
(4) Somewhat dissatisfied (5) Very dissatisfied

17. What is the reason of dissatisfaction with the current water source?

18. What source of water would you like to have?

19. What source of energy do you use for cooking?
(1) Firewood (2) Charcoal (3) Kerosene (4) LPG (5) Electricity

20. Are you satisfied with your current cooking energy?
(1) Very satisfied (2) Somewhat satisfied (3) Neutral
(4) Somewhat dissatisfied (5) Very dissatisfied

21. What is the reason of dissatisfaction of with the current cooking energy?

22. What source of energy would you like to use for cooking?

23. Are you satisfied with your current lighting energy?
(1) Very satisfied (2) Somewhat satisfied (3) Neutral
(4) Somewhat dissatisfied (5) Very dissatisfied

C.2. Materials

24. What are the materials used in your house?

Roof:	**Walls:**	**Window/Door:**

25. Are you satisfied with current materials in your house?

	Roof	**Walls**	**Window/Door:**
Very satisfied			
Somewhat satisfied			
Neutral			
Somewhat dissatisfied			
Very dissatisfied			

26. What is the reason of the dissatisfaction with the materials?

Roof:	Walls:	Window/Door:

27. What materials would you like have in your house? Why?

Roof:	Walls:	Window/Door:

C.3 Facilities

28. What is the type of facility you have in your house?

Kitchen	Bathroom	Toilet
(1)Shared kitchen (2)Private kitchen (3)No kitchen (4)Other	(1) Shared bathroom (2) Private bathroom (3) No bathroom (4) Other	(1)Shared toilet (2)Private toilet (3)Public toilet 4)Other

29. Are you satisfied with the facilities you have in your house?

	Kitchen	Bathroom	Toilet
Very satisfied			
Somewhat satisfied			
Neutral			
Somewhat dissatisfied			
Very dissatisfied			

30. What is the reason of dissatisfaction with the materials?

Kitchen	Bathroom	Toilet

31. What type of facility would you like to have in yor house?

Kitchen	Bathroom	Toilet

32. What is your current drainage system?

33. Are you satisfied with your current drainage system?
(1) Very satisfied (2) Somewhat satisfied (3) Neutral
(4) Somewhat dissatisfied (5) Very dissatisfied

34. What is the reason of the dissatisfaction with the current drainage system?

35. What kind of drainage system would you like to have?

36. What is your current refuse disposal system?

37. Are you satisfied with your current refuse disposal system?

(1) Very satisfied (2) Somewhat satisfied (3) Neutral
(4) Somewhat dissatisfied (5) Very dissatisfied

38. What is the reason of dissatisfaction with the current refuse disposal system?

39. What kind of refuse disposal system would you like to have?

D. Affordability

40. What percentage of your income is spent on housing? (including payment for water, electricity, gas,repairs and so on)
(1)less than 25% (2) between 25-35% (3)between 35-50%
(4) more than 50%

41. What percentage of your income are you willing to spend on housing? (including payment for water, electricity, gas,repairs and so on)
(1)less than 25% (2) between 25-35% (3)between 35-50%
(4) more than 50%

E. Habitability

42. How many rooms does the household occupy for private use?
(1)1 (2)2 (3)3 (4)4 (5) Other:
43. What is the total area occupied by your household?

44. How many people are there sleeping in the same room?
(1)1-2 (2) 3-4 (3)4-6 (4)7 or more
45. How many rooms do the household need?
(1)1 (2)2 (3)3 (4)4 (5) Other:
46. For what purpose do the household need more rooms?
(1) Sleeping (2) Socializing (3) Cooking (4) Bathing (5) Toilet (6) Other:
47. Are you experiencing any health threats related with the house?
(1)Yes (2)No
If yes, please specify:
48. Do you think of improving your house? Why?

49. What kind of improvement do you like to conduct? Why?

50. Do you think of moving from this house? Why?

51. What kind of house would you like to move to?

F. Accessibility

52. How did you have access to this house?
(1) Bought (2) Inherited (3) Rented (4) Occupied rent free (5) Other:
(for (1) go to question 52; for (2),(3),(4),(5) skip question 52)
53. How was the purchase financed?

(1) Savings (2)Loan from the bank (3) Money from relatives
(4)Microfinance (5) Other:

54. Did you ask for chief's permission accessing this house?
(1)Yes (2)No (3)I don't know

55. Did you have any problems accessing this house?
(1)Yes (2)No
If yes, please specify:

G. Location

56. How do you rate the location of this house with respect to listed facilities?

	Public Toilet	**Tro-Tro station**	**Primary school**	**Health Clinic**	**Work place**	**Church/ Mosque**
Very close						
Somewhat close						
Average						
Somewhat far						
Very far						

57. Are there any pollution sources nearby the house?
(1)Yes (2)No (3)I don't know
If yes, please specify:

58. How do you rate the location of the house with respect to pollution sources?
(1)very far (2)somewhat far (3) average (4)somewhat close (5) very close

G. Cultural Adequacy

59. Is compound houseCulturally adequate for you?
(1)Yes (2)No
Why?

Annex 2_ Ghana Atelier general household survey questionnaire

INSTITUTE OF HOUSING AND URBAN DEVELOPMENT STUDIES
ERASMUS UNIVERSITY ROTTERDAM – THE NETHERLANDS

GHANA ATELIER HOUSEHOLD SURVEY QUESTIONNAIRE

Purpose of the HH Survey: The purpose of this HH survey is to gather socio-economic data through responses from the inhabitants of Ayigya which will aid the students of IHS in the analyses of their respective research works for their master's thesis. The results of this survey shall be used solely for academic purposes.

A. Respondent Info

1. Age : _____
2. Gender : a. Male/ b. Female
3. Years living in Ayigya : _____ years
4. Position in household :
    a. Head of extended family
    b. Head of nuclear family
    c. Spouse
5. Civil status:
    a. Married
    b. Single
    c. Widow/divorced
6. Level of education:
    a. High school and above
    b. Primary school
    c. Not finished primary school
    d. No education
7. How often do you eat rice per week?
    a. None (skip Q8)
    b. once per week
    c. 2-3 times per week
    d. 3-6 times per week
    e. Above 6 times per week/daily
8. If you consume rice, how many kg of rice do you consume: ….
9. How many times per week do you eat meat?
    a. None (skip Q10)
    b. once per week
    c. 2-3 times per week
    d. 3-6 times per week
    e. Above 6 times per week/daily
10. If you consume meat, how many kg of meat do you consume per week: …..
11. If you consume oil, how many liter of oil do you consume per week: ….
12. Primary source of income:
    a. Salary employment (go to Q13 & Q14)
    b. Own business
    c. Agriculture
    d. Sub-letting
    e. Remittances
    f. Others: _____
13. If you're employed, what kind of employment?
    a. Public Servant
    b. Self-employed
    c. private Business,

d. Domestic Servant
e. Employed in Contract Based
f. Employed by a Company
g. Others: _____

14. How many people are employed in your work?
    a. 1-5 people
    b. 6-20 people
    c. More than 20 people

B. Land Ownership

15. Who controls the land that you live on?
    a. Yourself
    b. Your spouse
    c. Other family members (skip Q16)
    d. The government (skip Q16)
    e. The Chief (skip Q16)
    f. I don't know
16. How did you get the land?
    a. Bought
    b. Inherited
    c. Others: _____
17. Do you have statutory or customary property rights?
    a. Statutory (go to Q18)
    b. Customary (go to Q 19)
    c. Both (Answer Q18&19)
18. What statutory property rights do you have*****?
    a. Use
    b. Occupation
    c. Sell
    d. Cultivate
    e. Make physical improvements
    f. Inherit
    g. Pass on to children/ others
    h. Business - open a shop (formal/ informal)
    i. Manufacturing - making things
    j. Residence
    k. subletting
    l. Others: _____

19. What customary property rights do you have*****?
    a. Use
    b. Occupation
    c. Sell
    d. Cultivate
    e. Make physical improvements
    f. Inherit
    g. Pass on to children/ others
    h. Business - open a shop (formal/ informal)
    i. Manufacturing - making things
    j. Residence
    k. subletting
    l. Others: _____
20. What is the type of tenure that you have related to the land you live on:
    a. Occupation without status
    b. I own the land formally
    c. My spouse owns the land formally
    d. I own the land traditionally
    e. My spouse owns the land traditionally
    f. We rent the land
    g. Others: _____

C. Housing Construction and Building Materials

21. What is the household configuration?
    a. Single person
    b. nuclear family
    c. extended family
    d. other: _____

22. What is the type of the house you are living now?
    a. Compound house-Single storey
    b. Compound house-multi storey
    c. Single house-single storey
    d. Single house-multi storey
23. What is the household size?
    a. 1-2 people
    b. 3-5 people
    c. 6-8 people
    d. More than 8 people
24. How many rooms do the household occupy?
    a. 1
    b. 2
    c. 3
    d. 4
    e. more than 4
25. When was this house built?
    a. Before 1985
    b. Between 1985 – 1995
    c. Between 1995 – 2005
    d. After 2005
    e. I don't know
26. Who built this house?
    a. Self built by family member
    b. Hired contractor
    c. Former owner
    d. Government
    e. Others: _____
    f. I don't know
27. What materials have been used for the construction of this house*****? *(put a cross in the box of choice)*

a. Mud (blocks/rammed)	
b. Timber	
c. Sandcrete/Landcrete	
d. Concrete/cement e. Bricks	
f. Steel/aluminum	
g. Thatch	
h. Stone	
i. Particle board	
j. Others	

If others, please specify: _____

28. Where do you buy the materials from?
    a. The nearest market/shop in Ayigya
    b. The Kateja market in Kumasi
    c. Other market/s (please specify: _____)
    d. Manufactured at site
    e. Imported from a neighbouring state/country (please specify: _____)
    f. Imported from another continent (please specify: _____)
    g. Collected materials that can be reused from other old(demolished) building sites
29. What was the reason for choice this/these materials *****?

a. It was/is cheap	
b. It was/is affordable	
c. It was/is available at site	
d. It was/is available at the nearest market	
e. It was/is easy to use during construction	
f. It is easy to maintain after construction	
g. It was/is 'the best'	
h. Everyone uses it	
i. It is good for the Ayigya weather conditions	
j. Government gives subsidy for the use of this material	
k. It was easy to avail a loan to buy the material/s	
l. It is mandatory to use the material in house construction	
m. Others	

If others, please specify:_____

30. In general, how do you save your money?
    a. I have a personal saving account at bank;
    b. I have a joint saving account at bank with family/friends;
    c. I save to non-bank institutions, e.g. credit union, susu, loan &saving company
    d. Others: _____
31. Have any extensions been made on this house?
    a. Yes
    b. No (skip Q33-39)
    c. I don't know
32. Do you plan to extend your house in next five years?
    a. Yes
    b. No
33. When was the extension built?
    a. Before 1985
    b. Between 1985 – 1995
    c. Between 1995 – 2005
    d. After 2005
    e. I don't know
34. Who built the extension?
    a. Self built by family member
    b. Hired contractor
    c. Others, specify:_____
    d. I don't know
35. What is the reason of extension?
    a. Increase space for the household
    b. To earn rental income
    c. To start or facilitate business
    d. To use for storage room
    e. To improve drainage or sanitation system
    f. Others: _____
36. What types of room in the new extension?

a. Room/s	
b. Kitchen	
c. Store	
d. Toilet	
e. Corridor	
f. Verandah	
g. Others: _____	

37. Did you face any problem while doing the extension?
    a. Yes
    b. No (skip Q38)
38. What were the problems in realization of the extension? (*)
    a. Lack of adequate savings;
    b. Difficulty of borrowing from banks
    c. Difficulty of borrowing from other sources
    d. Difficulty procuring building material
    e. I'm not familiar with techniques required
    f. It's difficult to hire people to construct;
    g. Getting a permit from municipality/ Chief
    h. Others _____
39. How was the extension financed (*)?
    a. My savings
    b. My spouse's savings
    c. A loan from bank
    d. Microfinance
    e. Susu
    f. Money from relatives/friends/ employer
    g. Government subsidy
    h. Donation
    i. Remittances
    j. Others_____

D. Water Provision

40. What is your drinking water resource*?
    a. piped water supply system in the house or compound (answer Q41)
    b. Public Tap/standpipe (answer Q41)
    c. water from neighbours
    d. private water vendor (answer Q42-44)
    e. hand dug well (answer Q 45)
    f. borehole
    g. river, streams and ponds
    h. rainwater (answer Q51-53)
    i. other: _____
41. If you used piped water, how much is your monthly drinking water bill at an average?
    a. Less than 10 GH¢
    b. 10-25 GH¢
    c. More than 25 GH¢
    d. Others: _____
42. In case you buy from water vendor/ neighbour seller, how much do you spend every day?
    a. Less than 1 GH¢
    b. 1-2.5 GH¢
    c. 2.5-5 GH¢
    d. More than 5 GH¢, please specify: ___
43. How many jerry canes of water do you used in your household per day in case you but water from your neighbour seller? _____ jerry canes
44. How often you buy water?
    a. once a week
    b. Twice a week
    c. thrice a week
    d. Daily
    e. Others: _____
45. If you use hand dug well, how deep is the well?
    a. 3-20 meter
    b. 21-40 meter
    c. Deeper than 40 meter
    d. I don't know
46. What is "good quality of drinking water" means to you?
    a. water without any colour, smell and solid objects
    b. water disinfected
    c. water with sand
    d. others: _____
47. If you use any source of "E, F, G, H" in question43, how do you treat it?
    a. Disinfection
    b. filtration
    c. Boil
    d. I do not treat it
    e. others: _____
48. Why do you think the groundwater you uses normal days in Ayigya need additional treatment?
    a. the water might be polluted
    b. just in case (prevention for unpredictable issue)
    c. There is no need to do the treatment
    d. Others: _____
49. Who is responsible for your drinking water resources?
    a. Ghana Water and Sewerage Corporation (GWSC)
    b. Water and Sanitation Department of GWSC
    c. Community Water and Sanitation Agency (CWSA)
    d. Water Resource Commission (WRC)
    e. I don't know
    f. Others: _____
50. What is the issue about groundwater that you concerned the most?
    a. Quantity
    b. Quality
    c. Management
    d. Others: _____
51. Do you use of rain water harvesting from rooftops
    a. Yes
    b. Yes I used it in past, now abandoned

c. No

52. If yes to above, what type of storage facilities you use or used?
    a. In 20 liters gallons
    b. 200 liters drums
    c. PVC water tanks (Sintex, Poly tanks having……..liters capacity
    d. self constructed masonry/RCC water tank
    e. Others (please specify) _____

53. Do you know any advantages of RWH
    a. It saves my expenditure on water
    b. I get more water
    c. I do not have to waste time in fetching water
    d. I do not know

54. Are you interested in having RWH system in your house?
    a. Yes
    b. No

E. Sanitation

55. What type of toilet facility do you use?
    a. Pit latrine
    b. Ventilated Improved pit latrine
    c. Bucket
    d. Flush toilet with water-borne system (skip Q56)
    e. Flush toilet with septic tank (skip Q56)
    f. None of the above

56. How do you empty human excreta when the toilet is full?
    a. Use honeywagon truck
    b. Physically empting the pit
    c. Abandon the latrine

57. How many people use the toilet?
    a. Less than 5
    b. 5-10
    c. 10-20
    d. More than 20

58. Do Children use pit latrines?
    a. Yes
    b. No

59. How often do your family members contract diarrheal diseases such as cholera, dysentery, typhoid?
    a. Several times a month
    b. Once per month
    c. Once per 3 months
    d. Once per 6 month
    e. Once per year
    f. Never

F. Solid waste management

60. How do you feel the cleanness of these places include street, market, park and community?

	a. very clean	b. Clean	c. ave-rage	d. dirty	e. very dirty
i) main road					
ii) Park					
iii) Market					
iv) neighbourhood					

61. How do you rate the quality of current solid waste service?
    a. Very poor
    b. Poor
    c. Average
    d. Good
    e. Very good

62. Do you feel the situation is better compared with three years ago?
    a. Better
    b. Same
    c. Worse
    d. I don't know
63. How often the solid waste is collected per week?
    a. Everyday
    b. three times a week
    c. twice a week
    d. once
    e. none
64. Do you feel that the solid waste user fee is reasonable?
    a. Higher
    b. reasonable
    c. low

G. Health Insurance

65. Do you have a health insurance?
    a. Yes
    b. No (Go to Q69)
66. Which type of health insurance do you have?
    a. District mutual health insurance with premium payment
    b. Private health insurance
    c. Social security national insurance trust fund
    d. Commercial health insurance
    e. District mutual health insurance with premium payment
    f. District mutual health insurance exempted from premium payment
    g. Other: _____
67. How long have you been using the health insurance?
    a. <1 month
    b. 1-6 months
    c. 6-12 months
    d. 1- 2 years
    e. >2 years
68. Which of the following medical expenses does the health insurance cover?

Type of care	Coverage
Health care stay in a hospital for at least one night?	□ Full cost of medical consultation
	□ Partial cost of medical consultation
Health care without staying in a hospital?	□ Full cost of medicine
	□ Partial cost of medicine
	□ Full cost of medical consultation
	□ Full cost of stay in a hospital
	□ Partial cost of stay in a hospital

69. Have you or any member of your family stayed in a health facility for medical treatment at least one night over the past year?
    a. Yes
    b. No
70. What is the most recent disease that you or any of your family members stayed in a hospital for at least one night over the past year?
    a. Asthma
    b. Diabetes
    c. Heart disease
    d. Eye care
    e. Psychiatric care
    f. Other: _____
71. Have you or any member of your family members received medical treatment over the past month

without staying overnight in a hospital?
   a. Yes
   b. No

72. What is the most recent disease that you or your family members have received care over the past month without staying in a hospital overnight?
   a. Headache
   b. Tuberculosis
   c. eye care
   d. malaria
   e. Other:_____

H. Energy Consumption

73. What type of energy do you use*****?
   a. Firewood (answer Q74, Q77)
   b. Charcoal (answer Q74-Q77)
   c. Kerosene
   d. LPG/gas
   e. Electricity
   f. Solar (Answer Q78)
74. For firewood and charcoal user, for what purpose you use woodfuel for?
   a. cooking
   b. heating
   c. lighting
   d. others: _____
75. For firewood and charcoal user, what are the reasons for using this energy (*)?
   a. Cheap or free
   b. Can be obtained easily
   c. Convenient in consumption (i.e. quick cooking time)
   d. Tradition/habit
   e. No other energy substitution
   f. Others: _____
76. For firewood and charcoal user, what are the disadvantages of using this energy (*)?
   a. Indoor air pollution (smoke)
   b. Makes the house dirty
   c. Expensive
   d. Unstable supply
   e. Cause fire accident
   f. Took a long time to gather it
   g. Cause health problem
   h. Others:_____
77. For firewood and charcoal user, rank the option below according to which attribute is the one you considered most important?(5 is most important and is less important)

a. cheap woodfuel	
b. less smoke	
c. fast cooking time	
d. easy to collect	
e.	

78. For solar energy user, for that purpose you use solar energy for?
   a. cooking
   b. heating
   c. lighting
   d. others: _____
79. Do you have enough electricity per day?
   a. Yes
   b. No
   c. Almost, not enough but better than others who doesn't use solar energy
80. How many hours per-day you have electricity available?
   a. 1-3 hours
   b. 3-5 hours
   c. 5-7 hours
   d. 7-12 hours

81. How much you pay monthly for your electricity bill?
    a. Less than 10 GH¢
    b. 10-25 GH¢
    c. More than 25 GH¢
82. What kind of electric appliances do you use?
    a. Light
    b. TV set
    c. Radio
    d. Bridge
    e. Freezer
    f. Cooker
    g. Water heater
83. If you do not use solar energy, why?
    a. Too expensive
    b. I don't know how to get it / Too complicated to use it
    c. No need, I'm satisfied with the current power supply
    d. No obvious advantages
    e. Never heard of it
    f. Others: _____
84. If you used before, why did you give up using it?
    a. It's broken, the maintenance cost is too expensive
    b. Inefficiency
    c. Not cheaper than not use it
    d. Others: _____

I. Community Participation

85. What are you most satisfied with in the community?
    a. Roads
    b. Health facility
    c. Educational facility
    d. House standard
    e. Cost of housing
    f. Drainage system
    g. Recreational facility
    h. Toilet
    i. Solid waste disposal
    j. Community associations
    k. Employment
86. Which do you need most in the community?
    a. Roads
    b. Health facility
    c. Educational facility
    d. Better houses
    e. Drainage system
    f. Recreational facility
    g. Toilet
    h. Solid waste disposal
    i. Community associations
    j. Employment
87. Which of the following type(s) of organizations exist in Ayigya?
    a. Women's Association
    b. Business Associations
    c. Religious Associations
    d. Football Club
    e. Political Parties
    f. Youth Clubs
    g. Savings Group
    h. Residents Association
    i. Landlords Association
    j. Tenants Association
    k. Ethnic Groups
    l. Other: _____
    m. I do not know
88. How many are you active in?
    a. Active in One
    b. Active in two
    c. Active in three
    d. Active in more than three
    e. Not active in any
89. If you want to voice out your needs within Ayigya, who do you talk to ?
    a. Landlord

b. Leaders of Community Organization
c. Chief
d. Local Government Representative (Assembly member)
e. NGOs
f. I never talk about this
g. Others: …….

90. If you want to voice your complaints about Ayigya, who do you talk to?

a. Landlord
b. Leaders of Community Organization
c. Chief
d. Local Government Representative (Assembly member)
e. NGOs
f. I never talk about this
g. Others: …….

91. What types of services do you get from your community?
    a. Training services: business, housing construction, etc;
    b. Financial services: saving group, micro-loan, etc;
    c. Making petition, complaining, etc.
    d. Others
    e. None
92. Does the government inform you about their projects and/or works in Ayigya?
    a. Yes b. No c. I Don't Know
93. If government invites you to attend a meeting where you can have a say about your community will you attend?
    a. Yes (Skip Q94.) b. No c. I Don't Know
94. If No, why?
    a. I have little money
    b. I don't have high positions in Ayigya
    c. I have no high education
    d. I cannot speak English
    e. I have representatives (Chief, family member, landlord)
    f. I do not have the time
    g. I don't know
    h. Other……

J. Follow-up interview

95. Are you willing to answer for further questionnaire?
    a. Yes (Go to Q97)
    b. No