EMPIRICAL ANALYSIS OF SOCIAL INTERACTION BEHAVIOUR IN INFORMAL SETTLEMENT AS A BASIS FOR CONCEPTUAL AGENT BASED MODELLING (ABM)

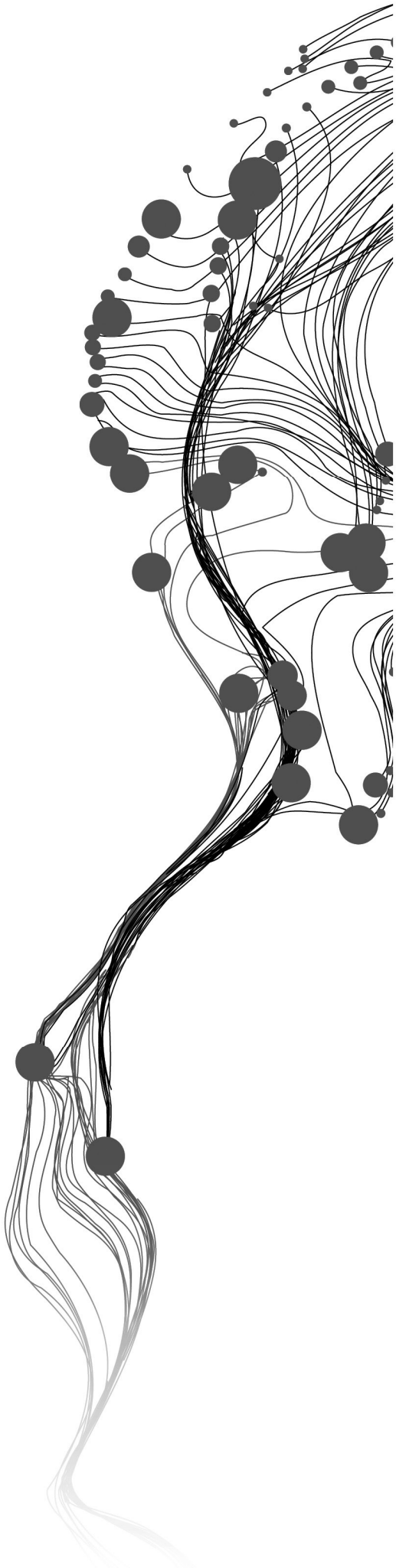
CASE STUDY: HANNA NASSIF DAR ES SALAAM, TANZANIA

FRINALDI

March, 2010

SUPERVISORS:

Dr. J. (Johannes) Flacke
Dr. R.V. (Richard) Sliuzas



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Enschede, The Netherlands, March, 2010

Thesis submitted to the Faculty of Geo-Information Science and Earth Observation of the University of Twente in partial fulfilment of the requirements for the degree of Master of Science in Geo-information Science and Earth Observation.
Specialization: Urban Planning and Management

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ABSTRACT

Informal settlements are one of the common problems faced by developing countries especially in Tanzania which has a large growing urban population. Indeed, Informal settlements have been increasing due to the imbalance between demand and supply of formal housing. The impact of the backlog in housing stock leads the low-income or even moderate-income groups to choose informal land and housing market. The lacks of the capacity of government for the provision of housing in planned urban areas, and the increase of number of low-income people force them to settle in unplanned or unauthorised settlements. Most of the initial accommodation of low income people who choose informal settlements as their place to live varies from staying with relatives or friends, or renting a house. Given this context, this study explores the interactions which lead the informal settlements people to get houses as an input for the existing conceptual agent-based model. The methodology used entailed the use of household questionnaire survey and interviews, to gather data on the process of how people get houses. The results show that social ties and social network is the main source of information which informal settlers use in order to seek their property. The new feature of social network was added in the existing conceptual model since when the respondents seek for the new house most of them were using their network. This research concludes that finding a house via social network in the common and majority of the seekers and this network depends on the length households have lived in an area.

ACKNOWLEDGEMENTS

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

This chapter describes the framework and background research in general, and will discuss issues that motivate the research and justification for this research. Conceptual framework and theoretical introduction highlights the linkages and integration concepts of social interaction in the process of housing. The study design described to provide an overview of this research.

1.1. Background

As stated by Anna K. Tibaijuka (UN Habitat Executive Director) that rapid urbanization and its impacts are become the most pressing issues in the world in which the urbanization can bring about some problems for the low income people and other urban problems. Such condition according to Sioufi et al., (2009a) was reflected in the high urban growth rate in Sub Saharan Africa and most of the them were living in slums or informal settlements and make the concentration of poverty is moving to cities or towns (Sheuya, 2010). At present, around one billion people are living in slums or informal settlements and in 2020 this number is expected to grow up to 1.4 billion (ISFEREA, 2010) and there will be six billion people (two-third of world population) will be a urban people in 2050. This condition needs to be a major concern among stakeholders, especially governments to control unprecedented urban growth as a trigger for the rapid growth of informal settlements. The motivation to move to the city not only caused by the need to obtain greater opportunities in urban centres, but also the need to survive, due to the decline in employment opportunities in agriculture in rural areas (Limbumba, 2010).

Informal housing or settlements have been increasing due to the imbalance between demand and supply of formal housing and this phenomenon is common in developing countries. The impact of the backlog housing stock lead the low-income or even moderate-income groups' people to choose informal land and housing markets. Lasserve (1987) says the public sector has no significant role anymore in the housing provision in most of developing country to provide land or housing to the people. Because of the limitation of public sector, the private sector took this role of housing provision in the process of land supply and housing development. Meanwhile for the profit oriented, this private sector is generally targeted the upper-middle class people who have regular jobs and access to formal credit.

These conditions make the moderate-low income people more difficult to get an access to the formal housing or land and make them rely on informal land and housing markets (Lasserve, 1987). This condition affected in the spread of informal housing and the expansion of irregular settlements since the numbers of lower middle-class population is high enough in most cities of developing countries. The struggle for the shelter of low-income groups' people to find housing leads them to live in informal house. Most of the poor people will choose to settle in informal settlements in order to reduce the cost and accept to live in inadequate, dangerous, overcrowded, insecure and poorly areas.

1.1.1. Informal settlements in Dar es Salaam

Informal settlements are one of the common problems faced by developing countries especially in Tanzania in which 25% of population live in urban areas and the urban population is growing rapidly at over 4% per annum, around twice the national rate of population growth (Parsa, Nakendo, McCluskey, & Page, 2011). Informal settlements are an integral and inevitable for most of the cities of developing countries and play a key role in their socio-economic development (Majale, 2008).

Informal settlements in Dar es Salaam is growing at a very fast, where the average housing have been built without building permits (Odunuga Olaniy, 2009; Wells, Sinda, & Haddar, 1998). Before independence in 1961, Dar es Salaam was a small town and the tremendous growth was starting after the independence. The main cause is the growth of informal settlements (Odunuga Olaniy, 2009; Sliuzas, Ottens, & Kreibich, 2004) and recently almost 70% of urban population are living in slums and informal settlements (Kombe, 2000; Magigi & Majani, 2006b; Sheuya, 2010). The existence of informal settlements can not be separated from the inability of governments to provide the housing needs and along with the not fully planned land administration system. Although the government has tried to facilitate the land and affordable housing for the rapidly growing urban population, but as it grows very rapidly lead to this result difficult to achieve. As a result of informal housing development process continues to give shelter to housing and livelihood for the urban population (Limbumba, 2010).

According to UN-HABITAT, slums or informal settlements are defined based on the inadequate access to safe water, inadequate access to sanitation and other infrastructure, the overcrowding, insecure residential status, and poor quality of housing structure. This definition according to Sheuya (2010) are not absolutely applicable in Tanzania because most of the landholder in informal settlements having a legal residential status and only the first three characteristic are found in Tanzania's informal settlements. In terms of ownership, the informal settlements in Dar es Salaam cannot be regarded as illegal or slums and even squatter settlements (Sheuya, 2007). Sheuya (2010) says three fundamental different of the informal settlement in Tanzania namely: tenure security, quality of housing structure, and the nature of people who live in these settlements.

Table 1-1 Major differences between formally planned and unplanned (informal) settlements in Dar es Salaam (Sheuya, 2010)

No	Factors	Formally Planned	Unplanned (Informal)
1	Plot boundary	Clearly demarcated and surveyed (cadastral survey)	Plot boundaries not physically demarcated but known to plot holders and adjoining neighbours and defined by hedges, trees or other artefacts
2	Land tenure	Relatively easy to obtain Granted right of occupancy and Occupancy under Letter of Offer	Residential license can be obtained once the area is regularized
3	Roads	Roads clearly demarcated and to design standards	Road reserves obtained through "social regulation"
4	Community facilities	Spaces for community facilities provided for in the plan	Their availability largely depends on "social regulation"
5	Basic services	Basic sanitation and portable water varies from one settlement to the other and when provided it is generally inadequate to meet demand	Varies from one settlement to another
6	Development control	Development control enforceable	Cumbersome and not legally easy to enforce.

1.1.2. Social interaction in informal settlements

Social interaction refers to the relationships between people in which the relation is not one-sided. In fact the relations among people always have a reciprocal influence. According to Nisbet (2011), interaction theory point of view said that a perception from people and their reaction of certain things were not stand alone but it was influenced by prior ideas, valuations, and assessments from external world. There is

always other people involved in the socialization or the modification of someone thoughts, roles, and their behaviour through contact with other people (Nisbet, 2011).

Social interaction is an action of a person or group of persons that influence individual preferences and the influences are usually come from a family, neighbours, friends or colleagues (Scheinkman). The social interaction itself is also a reciprocal relationship and response between individuals, between groups or between individuals and groups and can take place if it meets two conditions; social contact and communication (Rummel, 1976). The social contact and communication among different persons will share the behavioural norms, and cultural values of their society because man as a social group will always connect and communicate; socialize with kinship systems and many other human attributes that influence each other as well as having forms of influence over their environment.

Civic organizations have been an important feature of the social and economic life of people in Tanzania since colonial times. The local leadership have the important roles in the process of land transaction and development process. According to (Lusugga Kironde, 1995) the common land transaction process was done by using a broker or middleman which arrange the meeting between the land sellers and buyers, when the agreement took place, the parties met the local leader to register the transaction in front of witnesses, such as neighbours or relatives. The social organization in informal settlements in Dar es Salaam which likely based on the local (grass root) actors (Magigi & Majani, 2006a; Sliuzas, et al., 2004) in the managing their development had strong linkages to the individuals and other actors in the local level. Grassroots leaders (ten cell) and social groups are closer to the residents and created trust, (Magigi & Majani, 2006a) norms, and network among individual in the households process (figure 1-1).

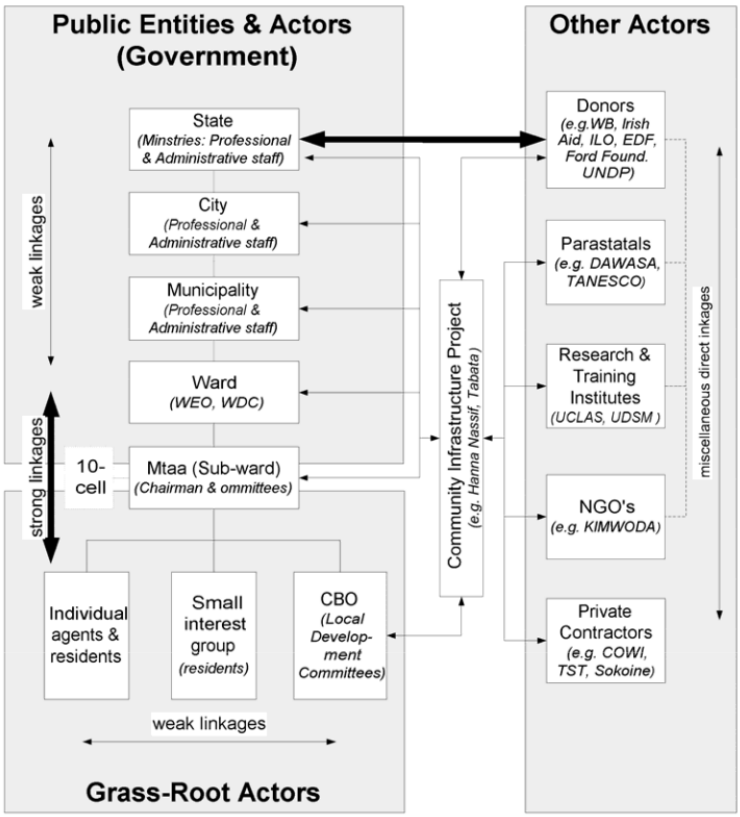


Figure 1-1 Actors and linkages in informal settlement (Sliuzas, et al., 2004)

1.1.3. Housing process in informal settlements

Most of the informal dwellers construct their houses through necessity. It is common to find the initial housing type in informal settlements which is still in the form of rudimentary house. The pattern of housing provision by giving the space for the private sector or self-help housing is considering as a good way for the low income people given the limitations of government in the housing provision. Self-help housing process as Turner (1976) points out is a system in which poor people build their own house base on their skills and motivation. This process will be cheaper and they can gradually improve their house depending on the life situation. Informal settlements in Tanzania differ from common informal settlements in other African cities in that most the people are the owner of the house rather than renter and very few people occupy land without permission from the landowner (Sheuya, 2004). Housing process has different stages starting from land acquisition, house construction, house extension and house renovation or even starting from house acquisition.

This provides an opportunity for the communities themselves as workers in building and construction management of their homes in accordance with the financial capability (Rakodi & Withers, 1995). According to Sheuya (2004) the initial houses in Dar es Salaam built from temporary materials such as mud and pole and the majority of the houses are single storey building. The design will be flexible in order to accommodate gradual changes over time as more funds and materials are acquired. In order to know the kind of housing process, there are five main aspects of housing process and in informal settlement this process gradually changes. The five main aspects are:

1. Land acquisition or house acquisition
2. Erection of new house or the new construction.
3. Renovation, this process is emerge because of most of the initial house was built in basic form base on locally available material such as mud.
4. Extension of building by adding certain structure because most of the households start building their houses in rudimentary structure or core house and they will start making some extension if they have more funds to accommodate certain need such as: more children or to open home- based economy
5. Adding complementary structures such as latrines and kitchens, as well as structures used for home based business (Sheuya, 2004).

1.2. Prior research and knowledge gap

Young (2010) in her studies about the conceptual agent-based model in informal settlement base on socioeconomic factors in the housing process. In this study the main aspects being discussed are from the socioeconomic point of view which categorizes the agent into four categories base on their different behaviour: 1. Tenant households with formal employment, 2. Owner households with formal employment, 3. Self-employed tenant households, and 4. Self-employed owner households.

There are two modules developed in her study; agent transformation module (ATM) and decision making module (DMM). At the agent transformation module (ATM) phase of the conceptual ABM developed by Gina Young, the general idea is the agents stand alone which is caused by internal factors. At this stage of ATM driving factor derived solely from the internal agent, such as psychological conditions, increasing the number of children, and discomfort with the existing housing conditions which determine the agent to enter the decision making module (DMM). In the DMM, the agent will perceive the environment based on the neighbour condition, lot price and the utility value before they decide to settle in certain plot.

The concept for an agent based model presented in this study is base on the socioeconomic factors and the approach is purely economic standpoint (Young, 2010). As Young (2010) states the economic aspects

alone does not adequately capture the process and reciprocity within communities and between households based on trusts deriving from social ties (Sheuya, 2010) are also some aspect which influence the process.

1.3. Research problems

Availability of and access to cheap land is one of the key factors of the preference of the inhabitants to live in informal settlements. The lacks of the capacity of government for the provision of housing in planned urban areas, and the increase of number of low-income people forced them to settle in unplanned or unauthorised settlements (Hayuma, 1979). Limitations in terms of economic capacity and high prices of homes in the planned area lead them to choose cheapest and accessible housing in informal settlements as a place to live. Sietchiping (2004) describes the common feature of informal settlements which mostly occupy marginal or less valuable land such as riverbanks, prone areas, abandoned plots, along transportation networks, near to the central activities, and abandon public plot.

Most of the initial accommodation of low income people who choose informal settlements as their place to live varies from staying with relatives or friends, or renting a house/room (Smit, 1998). Another way is by renting a house before getting their own land or buying their own homes. Having your own home or moving to another plot in informal settlements is an easy choice considering the difficulty to obtain a house in formal settlements, whether caused by financial capability or processes that are considered complicated. The informal pattern will become a choice in transaction because of the greater toleration of informal settlements in some areas. Another possibility for some people is by squatting abandon or vacant land and building shack from waste materials they find in informal settlement.

Sietchiping (2004) states that a dynamic model and simulation tools are useful for urban planning and informal settlements policy formulation. Modelling urban systems which can help to understand the mechanisms of urban evolution (Li & Liu, 2007) are important because informal settlements are the result of combination of factors such as poor management, especially failed urban policies, poor governance, corruption, inappropriate regulations, dysfunctional land markets, social insecurity, poor economic performance and lack of political will (Sietchiping, 2004).

Given this context, the initial assumption about connection and communication among people in informal settlements and the mixed up characteristic of inhabitants, this study try to elicit the interaction process of informal settlements during the housing process. In informal settlement, communities act on their own rules because the government has being playing a facilitation role over the people and lead communities to establish their own unofficial governance (local leadership) and law keeping (norms and rules) in dealing with their informality in housing process or *"formalizing their settlements"*. The study seeks to depict how the informal settlement dwellers carried out their housing process and who are the main actors involve and in what kind of interaction exist in the process since the informal pattern of the housing provision is a dominant choice among inhabitant.

1.4. Research objectives

This research was conducted to meet the following objectives:

Main objective

To analyze the social interaction in informal settlement that contributes to the housing processes and develop a model component in providing input on existing conceptual models of informal settlements growth.

Specific objective

1. To identify and describe the social interaction in informal settlement during housing process;
2. To provide empirical evidence on the role of social interaction as agent behaviour in housing process;
3. To develop and combine the data gathered into the existing conceptual model of ISG..

1.5. Research questions

1. To identify and describe the social interaction in informal settlement during housing process;
    1. What kinds of social interaction exist during the housing process?
    2. Who are the main actors involve in the process?
2. To provide empirical evidence on the role of social interaction as agent behaviour in housing process;
    1. How the agents initial occupy their plot?
    2. What driving factors lead them to choose their settlements?
    3. What norms and regulation the agent follow in the housing process?
3. To develop and combine the data gathered into the existing conceptual model of ISG.
    1. What should be include and at what level of detail to ensure the information gathered suit for the purpose of the study?
    2. How to structuring those data gathered into existing conceptual ABM of ISG?

1.6. Conceptual framework

In this study the conceptual framework is dividing into 3 main parts, which are understanding phase, empirical phase and validation phase. Part 1 is concerning with the understandings of the theoretical framework of the social interaction in informal settlement during the housing process. This part will base on literature review and household interview.

Having the framework of social interaction related to the driving factor that influences housing process, empirical analysis will be done in order to provide empirical evidence. Because of the study try to enrich the existing conceptual ABM of informal settlement growth, the driving factors will focus on agent social interaction factors would lead to the decision making in the housing process. At last stage, the interpretation and analysing data will be validate in order to determine which data should be include and exclude in the existing conceptual model.

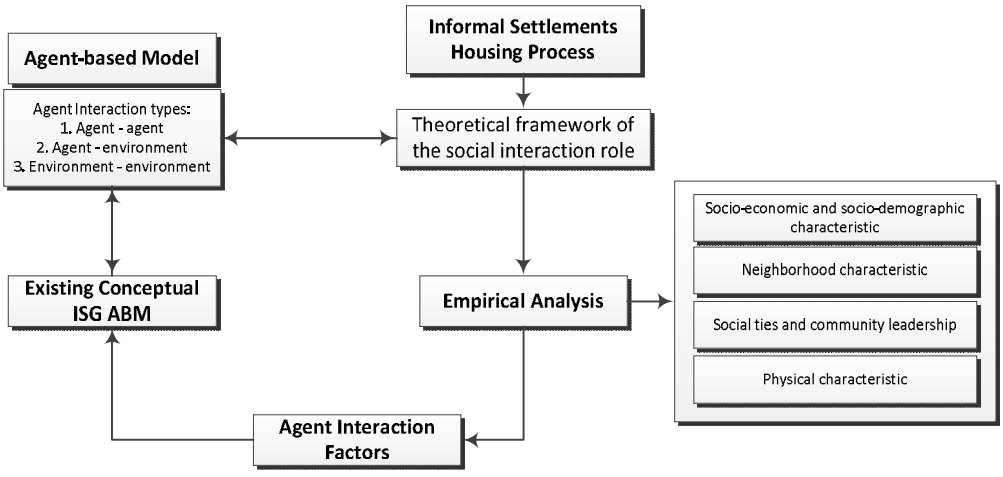


Figure 1-2 Conceptual Framework.

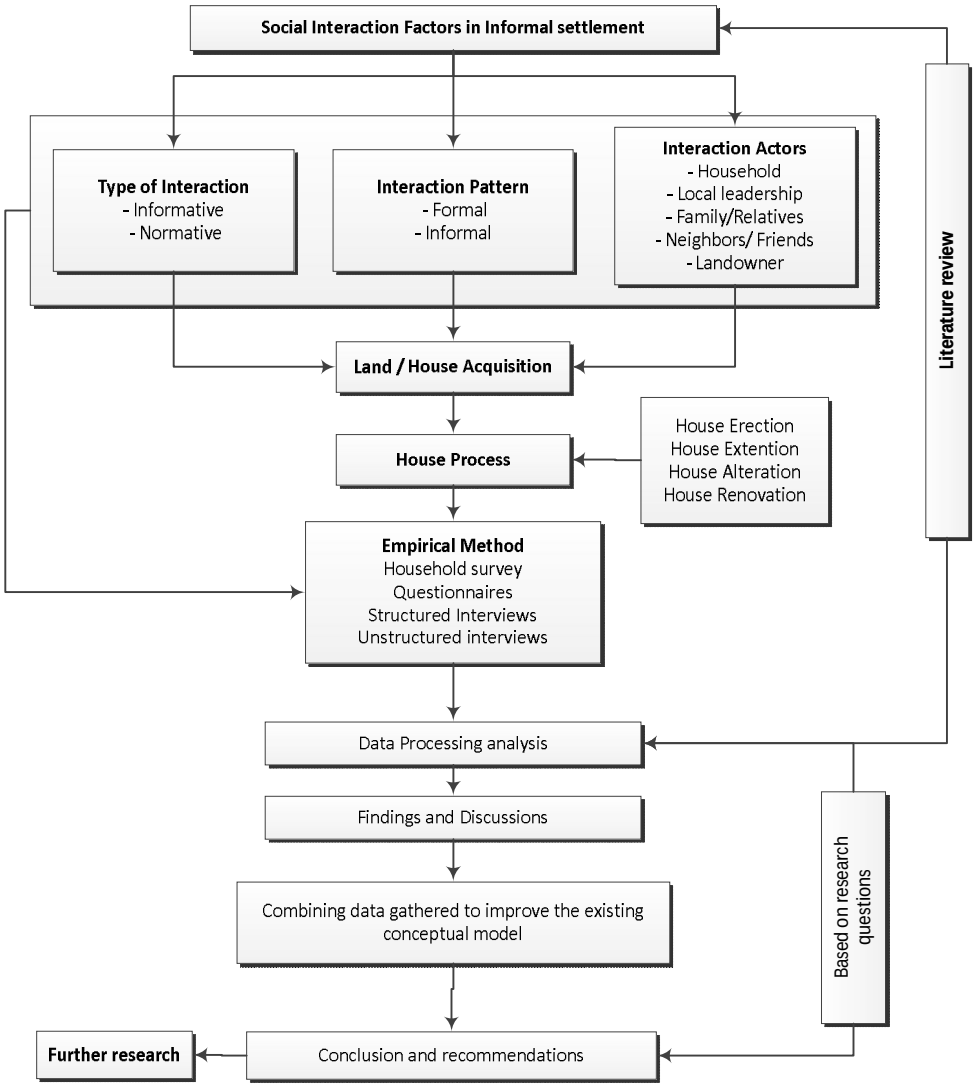


Figure 1-3 Research Design

In conducted the research of the social interaction in the housing process, the research design was described as illustrated in figure 1-3. The social interaction of the study area were tried to find out in order to know the characteristic of interaction such as type of interaction, actors, and the interaction pattern along with the analysis of empirical evidences based on the fieldwork. The activities in the housing process were explored such the type of housing process and type of acquisition. Based on the literature review about all general the condition of interaction and housing process, the empirical study were conducted from the fieldwork. The data from the fieldwork were analysed to find the interaction condition among respondents then linked with the housing process which exist in the study area. The information will be analysed to examine the possibility of the involvement of other parties in the respondents housing process in order to improve the existing conceptual model by adding certain input especially to describe the interaction between agents in their housing process.

1.7. Thesis structure

Chapter 1 gives the introduction to the research by giving the background information about informal settlements and interaction in housing process among residents. The research problem and knowledge gap is discussed. The main objective of the research is described with the research questions and justification thereof of carrying out this research.

Chapter 2 consists of literature review about informal settlements of housing provision. In this chapter gives a literature review on the housing process and social interaction in study area, the agent-based model and also discussed the existing of conceptual model.

Chapter 3 consists of research methodology and process of data collection research design and the analysis process in order to answer the research questions.

Chapter 4 describes result about the interaction and housing process in the study area. The characteristic of respondents were described in different spatial characteristics within the study area.

Chapter 5 presents the discussion from the finding in chapter 4 in order to answer the research question and interpreted the result into the main research objective.

Chapter 6 concludes the work and provides some recommendations.

2. LITERATURE REVIEW

This chapter gives a detailed theoretical foundation of this research by reviewing literatures of informal settlement social interaction and housing acquisition process. It also reviews the concept of agent based modelling

2.1. Informal settlements

Informal settlement is home to most of the poor who are difficult to obtain access to housing through formal channels. Informal settlements (often referred to as squatter settlements or shanty towns or slums) (Ali & Sulaiman, 2006) physically are dense settlements with self constructed shelters under conditions of informal or traditional land tenure. According to the UN Report within 30 years there will be one in every three people in the world who will live in informal settlements. Informal settlements are common features of developing countries (ISFEREA, 2010) and usually associated with the condition of legality of tenure status and/or the non-adherence with the building rule of regulation (Sliuzas, 2003).

Instead of physical factor other social factors also triggering as a driver to the existence of informal settlements are such as spiritual or religious factors cohesion or segregation or similar socio-cultural backgrounds. Most of the informal settlement dwellers tend to have previously lived in informal settlement (probably nearby) or they are planning to move to a future informal settlement (UN-Habitat, 2003). This suggests that established informal settlements duplicate themselves and serve as a stepping-stone for the emergence of future settlements on the nearest available land. Sietchiping (2004) says the close correlation between the informal economies and informal settlements is a important factor of the informal settlements growth since knowledge, skills and experience are not pre-requisites for accessing the job market in informal sectors.

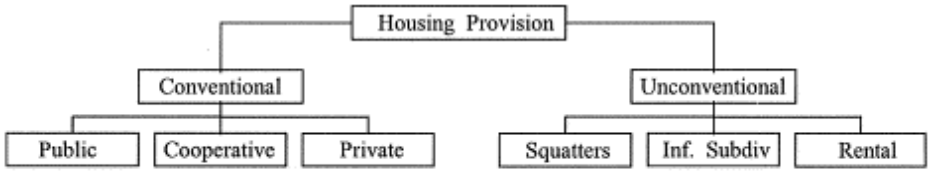
Informal settlement describes as a settlement in which most of the houses were built illegally, without following or abiding a rule or regulation from government or planning authority. This informal settlement is not a term used to describe all sub-standard housing, since it can be found in informal settlements which have high development standards, for example, a few blocks of apartments built in Ankara but has no official license in its development because they are not approved or even reviewed by the local authorities[1].

2.1.1. Housing provision modes in informal settlements

The common means of land transaction in developing country are obtained in informal means, and the housing provision in informal sector provides much more land to most people and majority of them are the poor (Lusugga Kironde, 1995). The common housing process in informal settlements is derived from the rudimentary house from local material depend on the availability of funds and materials. The housing design is also flexible in order to accommodate next gradual changes over time as more materials are acquired. It is known as a incremental housing process and as a self-financing strategy used by the poor around the world to improve their housing ("Habitat for Humanity Tanzania," 2010).

Housing provision in developing countries is classically divided into two main groups of conventional/formal and unconventional/informal modes of provision and these main groups of provision can be subdivided into different modes based on condition or the process (Keivani & Werna, 2001).

[1] http://parole.aporee.org/work/hier.php3?spec_id=14639&words_id=731



Source: adapted from Drakakis-Smith, 1981.

Figure 2-1 A conceptual model of housing provision in developing countries (Keivani & Werna, 2001)

Meshack et al. (2004) argued that three years after national independence the development of urban area has increased almost in the radius of 6 km and ten years later the urban centre in Dar es Salaam becomes one of the destination of rural-urban migrants (Parsa, et al., 2011). Tanzania has tried to improve the housing provision especially for the low-income population who mostly use the unconventional access for their housing. The government at that time launched some programs such as slum clearance, sites and services (Magigi & Majani, 2006b). Due to the inability of governments to provide the housing needs, the informal settlements still grow and become a major pattern of housing provision among the population in Tanzania, either in the form of squatting, informal subdivision or rented. This condition is also affected by the private or individual housing development will increase? (Magigi & Majani, 2006b). In order to provide more housing for the low income people, in the early 1970s site-and-service schemes became popular in the developing countries. Site and service schemes was initially introduced by John Turner who taught about self-help housing whereby governments can help people to acquire modest homes by building their own (Harris, 2003).

2.1.2. Dar es Salaam informal land and housing pattern

Ownership of land in Tanzania is governed by the Land Act 1923, whereby all the land in this state and public property are in the hands of the President. Besides, access for housing is given by the government through right of occupancy (Lusugga Kironde, 1995). As Sheuya (2004) stated, in Dar es Salaam most of the household are the owners of the house rather than renters. They have their plot by buying it from the landholder, in which the process of land acquisition involves buyer and the sellers in informal or unconventional pattern. The process of land acquisition in Dar es Salaam involves the buyer and the seller; local leaders and neighbours are involved as witnesses (Magigi & Majani, 2006b) in the unconventional pattern. The informal land acquisition put the local leaders as the important actors as well as the neighbour adjacent to the parcel (Fig. 2-2 and 2-3).

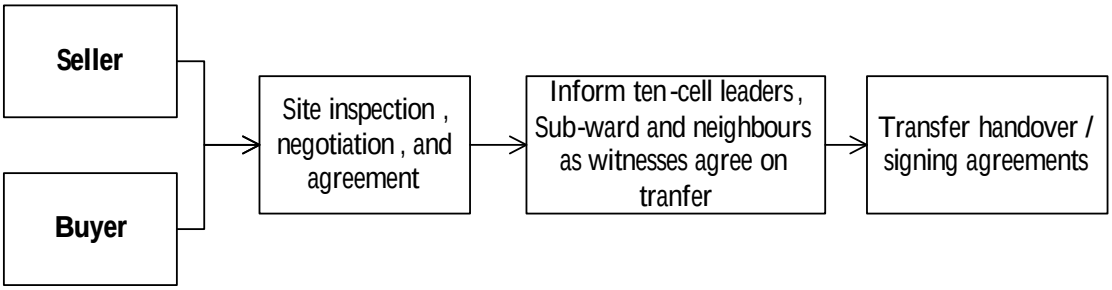


Figure 2-2 Informal land transfer and parcelling process (Magigi & Majani, 2006b).

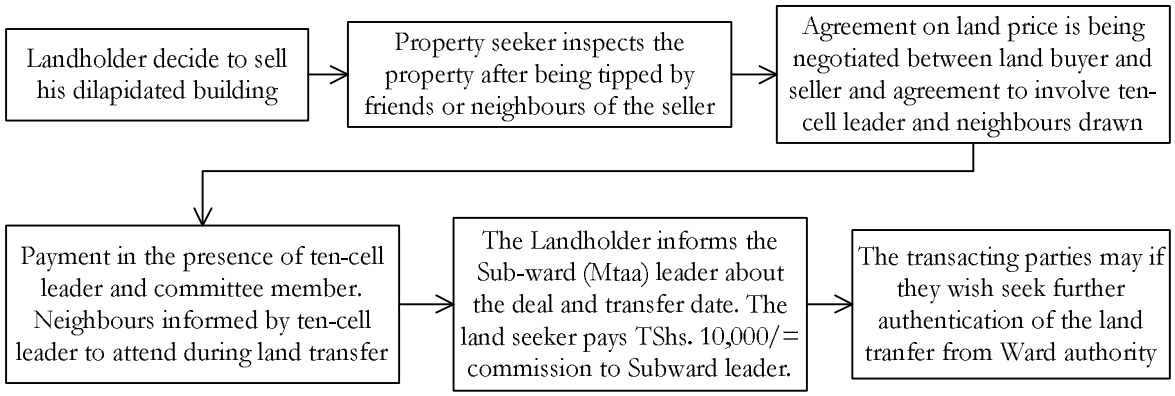


Figure 2-3 Informal land transfer and parcelling process in Ubungo Darajani (Magigi & Majani, 2006b).

In this process, there is no doubt that the absence of official control and regulation leads the local regulation more active and has a bigger role in this process. The unconventional process of land and house transfer by involving social organizations and community participation will reduce risks and transaction costs for land acquisition, housing and home improvement serving for most of the low income people. Informal land transaction were said to be preferred because they are cheaper and not bureaucratic (Magigi & Majani, 2006b). Kombe (2005) states more than 70% new houses in Dar es Salaam between 1970 and 2000 were built in unplanned area and the land acquired through informal land markets.

According to Sliuzas (2004) urbanization in Sub-Saharan Africa is often associated with the urbanization of poverty and the widespread development of informal settlements. Along with the limited capacity of government in the adequate housing provision system for the urban poor people (Miraftab, 1997), urbanization in Tanzania is reflected by the growth of informal settlement, spatial expansion, densification of settlement, social services and public utilities deterioration. In recent times, the informal settlements growth has become a major problem associated with the expansion of the city of Tanzania. According to Miraftab (1997) in 1982 the informal settlements in Dar es Salaam were 25 settlements and this number have increased to more than 40 informal settlements in 1992 . This is as a result of existing policies and regulations of urban formal planning which unable to overcome the speed of growth. Dar es Salaam is a city with the most informal settlements in Tanzania; about 70% of the population live in informal settlements (Kombe, 2000; Magigi & Majani, 2006a; Sheuya, 2010; Sioufi, Grimard, Kithakye, & Sommer, 2009b).

Considering the inevitability of informal settlement growth, government recognizes the need to strengthen legal rights for the urban poor as a way to improve their livelihoods as well as the urban economy by ensuring the provision of better water, sanitation and other key services (Parsa, et al., 2011). For this reason the Tanzanian government has launched several programs in order to give a legal status for the informal settlers' properties, because the majority of them bought their land from landholder even though through informal or unconventional pattern.

2.1.3. Incremental Housing Process

As stated in Habitat for Humanity Tanzania report, in Dar es Salaam, families often save building materials near to their plot where they intend to build. They start to build their house step by step base on their funds and the materials availability. When there are sufficient funds, foundations and walls are built to continue the in-kind savings in the form of the structure of the house. In this process of informal housing which incremental process (step by step) the authorities do not have grate impact over the people, but communities have owned unofficial governance and law keeping ("Habitat for Humanity Tanzania," 2010). The informal settlements continue to expand in Dar es Salaam since the city government have

limitation to provide formal housing and infrastructure services. The informal settlements exist because of the increasing levels of poverty, the high number of population growth in the urban area along with the lack of housing provision from the authority. In Dar es Salaam itself, the growing is approximately eight percent per annum and 70 percent of the urban population is accommodated in informal housing.

Figure 2-4 Incremental housing in case study area (fieldwork)

Most of the respondents have no access to conventional system of housing in order to get their house. This condition lead them to use their own way of housing provision and mostly by financing their housing need through generated from family savings and sale of assets as well as loans from friends and relative. Incremental buildings are seen as very appropriate to them as the strategies to cope with their financial limitation whereby in the incremental process they can adapt their needs and financial conditions (Ferguson & Smets, 2010).

Sheuya (2007) describes that majority of the household have different financial source base on the different stage of the development process in their housing development**.** This incremental housing according to Sheuya (2004) takes five stages starting from initial stages of house construction in small or basic condition usually consist of few rooms and in the last stage the made alteration and room extensions. In the last stage the homeowner usually have different reason of extension and alteration.

This incremental housing process is also found in Hyderabad, India. Ferguson et al., (2010) describes the incremental housing process of Hyderabad 's slum dweller whereby most of the population completing their houses base on the availability of the sources. The slum dwellers usually complete one stage of the housing development process and they will stop the process until they have opportunity and sources to continue the next step of the housing development process. This incremental housing process can take years of time until the house finally completed such as in Hyderabad which takes 23 years in four stages of housing development.

2.2. Informal settlements and social interaction

In Dar es Salaam, the social interaction of different actors in a group is depicted by such norm such as households get a permit for build their house and inform to their respective ten cell, sub-ward and community organization leaders about intentions to subdivide or to sell their land (Magigi & Majani, 2006a). As stated by Sheuya (2004) the social regulation in Dar es Salaam form a security in tenure of informal settlers and some actors was involved in the process. The settlers' everyday lives interact with local structures and with distinctive individual and inter-personal experiences. All of the actors in the interactions processes have a role in each process of development in informal settlements, starting from initial settling until they having certain activities in the settlements.

According to Kironde (2006) The majority of informal settlements in Dar es Salaam has a pattern of acquisitions in general through allocation by local leaders, legacy, and purchases from people who claim to own land. In general, the poor land owners usually do the division of land and sell their land to get money. Because the buying process is in the informal process, the validity of ownership could be in the form of purchase agreement, purchase receipt, or in other forms. Even the recognition of ownership may be based on the length of their stay and use of land in the form of social recognition which involve local leaders, and government tolerance.

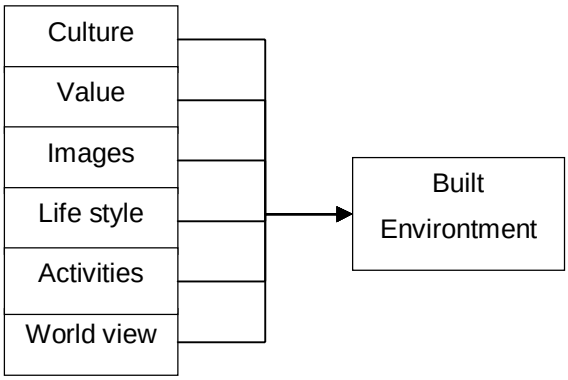


Figure 2-5 Global interactions and the built environment (Charalambous, 2007)

The informal settlements are different from the normative urban land management practice whereby the provision of community services and facilities are mostly provided by the people themselves and according to Kombe (2000) in this process the local leaders played an active role. The local leader mobilizes residents to contribute in cash or give their land for community facilities for example as a footpath between the dense houses. Sometimes during the construction of the public facilities the local leader will manage the resident as a labour during the construction. The local leader also have important role in the informal settlements especially in solving the problems among the settlers (Kombe, 2000).

2.3. Agent-based model

2.3.1. Why ABM

Some models have been developed as a tool to deal with the land use change analysis such as cellular automata (CA). Since CA is considered having some limitations generally in reflecting individual's behaviours. Later on, agent based models (ABM's) - event considered as a new approach – is being seen as a good model and have an advantage over other land use modelling methods in that they can solve some of the problems of addressing individuals' influences in urban systems (Li & Liu, 2007) and facilitates the implementation of tools for the analysis of social patterns (Pavón, Arroyo, Hassan, & Sansores, 2008).

This agent based models has gained increasing attention over the past 10 years because it offers a way of incorporating the influence of human decision making on land use in a mechanistic, formal, and spatially explicit way, taking into account social interaction, adaptation, and decision-making at different levels (Matthews, Gilbert, Roach, Polhill, & Gotts, 2007). ABM offers a way to combine human influence decisions about land use mechanically, formally and spatially explicit, taking into account social interaction, adaptation, and decision making at different levels. Specific advantages of ABM, including the ability to model the individual decision-making and their interaction in decision-making processes that can be combined with social processes and non-monetary influence, and dynamically can be associated with social and environmental processes (Matthews, et al., 2007).

One approach that is currently getting attention in the modeling community land use is an agent-based modeling, especially because it offers a way to change the transition probabilities or differential equations in one level (eg population) with the rules of decision entities at lower levels (ie individual or groups of individuals) together with the appropriate feedback environment .
An agent is defined as an object that controls its own behavior, and can be individuals of a species, individuals at some stage in the life cycle or group of persons who may be considered identical (Thompson & Reimann, 2010).

2.3.2. Main concept of ABM

The main concept of ABM is that it captures the observed behaviour of organized complex systems by using fine-grained entities (the agents) that represent the main drivers of changes in the state of the system. ABM is a simulation models in which decision makers are represented as a goal oriented entities capable of responding to their environment and taking autonomous action (Parker DC., as cited by Flacke, 2010). In which the main component of this ABM are agent (can be person/people, group of people, policy, decision makers etc), environment, time and randomness.

An agent-based model (ABM) (also sometimes related to the term multi-agent system or multi-agent simulation) is a class of computational model for simulating the actions and interactions of autonomous agents (either individual or collective entities such as organizations or groups) with a view to assessing their effects on the system as a whole. Agent-based modelling (ABM) is assumed to offer concepts and techniques for developing models of complex spatial systems (Ligtenberg, van Lammeren, Bregt, & Beulens, 2010). All agents are structurally coupled to an environment and to each other by a set of rules. In principle, each agent ‘‘behaves” autonomously and the rules that are applied to each agents will determine the behaviour of the entire system which is called emergence (Thompson & Reimann, 2010). The reactive or proactive behaviour of individual agents is determined by rules and based on reasoning about observations of an agent of its environment. The cumulative effect of the individual behaviour of agents is a global change in the state of the environment (Ligtenberg, et al., 2010). ABM is believed to enable the reconstruction of these mutual perturbation processes (Ligtenberg, et al., 2010).

In modelling social interaction in ABM, the agent (settler) in this point of view has different roles in its neighbourhood than they do as an individual. There are different processes and forces that determine how the agent behaves in its neighbourhood. People are all affected by the people they interact with, even they don't know personally other people and the social environments have a significant role in how people view themselves. Social interactions are the acts, actions, or practices of two or more people mutually oriented towards each other’s selves. It means that in the social interaction each person must be aware of each other - have each other's self in mind (Rummel, 1976).

The interaction between people emerges as most people try to find an agreement about what they see and how they have to behave (normative behaviour). The amount and quality of social relations and interaction in their neighbourhoods will lead to community cohesion. Normal people behave like other normal people and people who are different tend to be rejected or isolated and makes people tend to emulate the behaviour of the majority in their neighbourhoods. This condition emerge because of there are 5 types of interaction happens in the interaction among people that is cooperation, conflict, social exchange, coercion and conformity.

For example, survey data have consistently shown that African Americans prefer to live in integrated neighbourhood s with half blacks or a slight black majority (Zhang, 2009). As also state in Zang (2009), in 1982 the surveys about black preference neighbourhood composition, found that 61.6 percent of them

picked "half black, half white" as the top choice and during the 1990s survey also showed that 50 percent of black interviewees chose a 50-50 neighbourhood as the most attractive and 99 percent of them indicated a willingness to move into such neighbourhood s (Zhang, 2009).

There are three types of interaction in agent-based models; they include agents-agent interaction, agent-environment, and environment-environment interaction. In informal settlement model, there are two types of interaction; these are agents and agent-environment interaction. In the agents interaction, one agent will interact with one another in order to influence or attract other agents for certain purpose. For example, low-income agents will attract other lower income agent to settle in the same area but it wil discourage high income agent to come the same neighbourhood (Odunuga Olaniy, 2009).

2.3.3. Social network

Social networks represent both a collection of relations between the people and the strength of the bond based on the types of interdependency, such as friendship, kinship, or other kind of relationship between individual. The main assumption in the social network analysis is the relationship among unit (actor) in which the relation or interaction among them is the main part of the network analysis (Wasserman & Faust, 1999). In the social network all the actors are connected and interdependent among others. The social network analysis has been use in variety of study (Mika, 2005) and more influenced by the type of ties and networks in which people are involved.

Röper et al., (2009) states in the search theory assumption, every individual will calculate costs and benefits of their search methods and they will prefer to use the method with the highest net benefit and with lower cost. In this assumption, an individual tend to look for a good result by using the information about it through a lower cost networks and the use of informal channels is considered lowers the search cost and usually leads to more positive outcomes (Röper, et al., 2009). People who are looking for a new home can find it in some way (Röper, et al., 2009), either through formal means such as newspapers, housing corporation / real-estate agent or through informal channels. According to Röper, et al., (2009) in his study usually 25% or more of the people who look for a home use their social network to attained their new house in Netherlands.

Röper, et al., (2009) in his study states that social networks have some benefits because they give a good information which suit the people based on their needs. Based on the their networks or relationship with others, people can get detailed information about the transaction of the goods and reducing the risk of opportunism associated with the transaction (Röper, et al., 2009). Röper, et al., (2009) also says that theoretically and empirically it has been proved that social contacts have certain benefits, for example in giving the seeker the appropriate and satisfying output which they look for. DiMaggio et al., (1998) find that people who made a transaction with people they already know - such as friends or relatives - seem to be more satisfied with the good they bought. This condition reveals that they get the goods which reach their need and reduce the risks of opportunism.

In Röper, et al., (2009) research found that many houses were found by the seeker throuh their social network and the networks size is important in the searching process because as he stated in his hypothesis the larger networks will increase the possibility of the seeker in finding a home via their social ties (Röper, et al., 2009). Röper, et al., (2009) also argued that searching through this social network consumes too much time especially for an individual who have limited time such as in the urgent situation. As Röper, et al., (2009) said in urgent situation whereby the time is limited, the social network is not so helpful in this case. However the networks are really help the seeker in collecting information on what they looking for such as houses or land to buy.

In social network analysis as Mika (2005) suggested considering about the way an actor (an individual or a group) being attached in a network in order to get the opportunities and constraints on the actor. The position occupied by each actor on the network will affect access and coherence in obtaining information. People use social network in finding their new houses as Röper, et al., (2009) said because of the networks have rich in resources provide more opportunities for the seeker. Mika (2005) argued that the position of the actors in the network will affect access to valuable information, resources, social support, etc. Dionne et al., (2010) says that the social networks can be modelled by the use of agent based models and it will give an insight about the interaction of actors such as in the communication rules and social structure.

According to Smith (2003) there are two types of networks namely horizontal and vertical networks. He define the horizontal networks as a relations between a seeker and their contact whereby the contact usually their relatives, neighbours, friends, or .the network did not involve a formal organisation. Meanwhile, the vertical networks are considered as a network in which the actors and their contacts is come from a formal organization. In searching of housing especially in informal settlements informal networks or contact often provide information with the right timing. Another benefit of the informal networks for the seeker is that they can give information in which sometimes the seeker can not have it from the formal networks.

2.4. Existing conceptual agent-based model

Conceptual model in broad terms is the process of abstracting a model from the real world (Kotiadis & Robinson, 2008) and the process of determining what to model (Robinson, 2007). Robinson (2007) defines a conceptual model as a non-software of the computer simulation model which describing the objectives, inputs, outputs, content, assumptions and simplifications of the model. Since ABM is a computer simulation in which need some input for the process of modelling certain phenomenon, this conceptual model need simulation modelling to determine whether it should be include, and exclude, from the model, and at what level of detail to model each aspect (Kotiadis & Robinson, 2008).

The recent study about the conceptual agent-based model in informal settlement was done by Gina Young (2010). This study developed the concept for an agent-based model for informal settlement growth base on socioeconomic factors in the housing process and categorized the agent into four categories base on their difference behavioural: 1. Tenant households with formal employment, 2. Owner households with formal employment, 3. Self-employed tenant households, and 4. Self-employed owner households. The model components of this study comprised of two main levels (micro and macro level).

At micro level, there are two modules of household agent dealing with their housing construction that are Agent Transformation Module (ATM) and Decision Making Module (DMM). The ATM consists of agents' state and models the transitions of agents in term the threshold of the agents attribute is reached. The threshold of the ATM in order to enter the DMM is the number of children, if the threshold reached the agents starts to make certain pre condition to seek a plot on which to construct a house. In the DMM, the agent perceives the environment base on certain attributes (pre condition) such as lot price, agent utility and neighbourhood characteristic before they come into their decision to construct or not construct a house (figure. 2-1).

Table 2-1 Internal and External Attributes of settlements generative forces (Srinivas, 1996)

Internal Attributes	External Attributes
Religion/Ethnicity	Land owner
Work place	Tenure security
Place of origin	Municipal/city government policies
Language	Length of stay in city
Length of stay in settlement	
Investment in housing	
Construction activity	
Presence of renters	

The concept for an agent based model presented in this study is base on the socioeconomic factors and the approach is purely economic standpoint (Young, 2010). As Young (2010) states the economic aspects alone does not adequately capture the process and reciprocity within communities and between households based on trusts deriving from social ties (Sheuya, 2010) are also some aspect which influence the process.

The conceptual model which develops by Gina is focus on the main idea of the interaction between agent (household) and their environments. The changing of agent state will lead an agent to enter the decision making to looking for a new settlement (plot) base on their information of perceiving their environments. The information which agent perceive are base on the neighbourhood characteristic, plot prices and the utility factors. In order to enhance the model, especially in the decision making module attribute, there are several attributes could be influences the process of housing construction in informal settlements. This study will try to elicit the interaction among agent which base on contact and communication among agents either base on internal or external attribute (Srinivas, 1996) that will act as generative forces and determine the quality and size of a settlement.

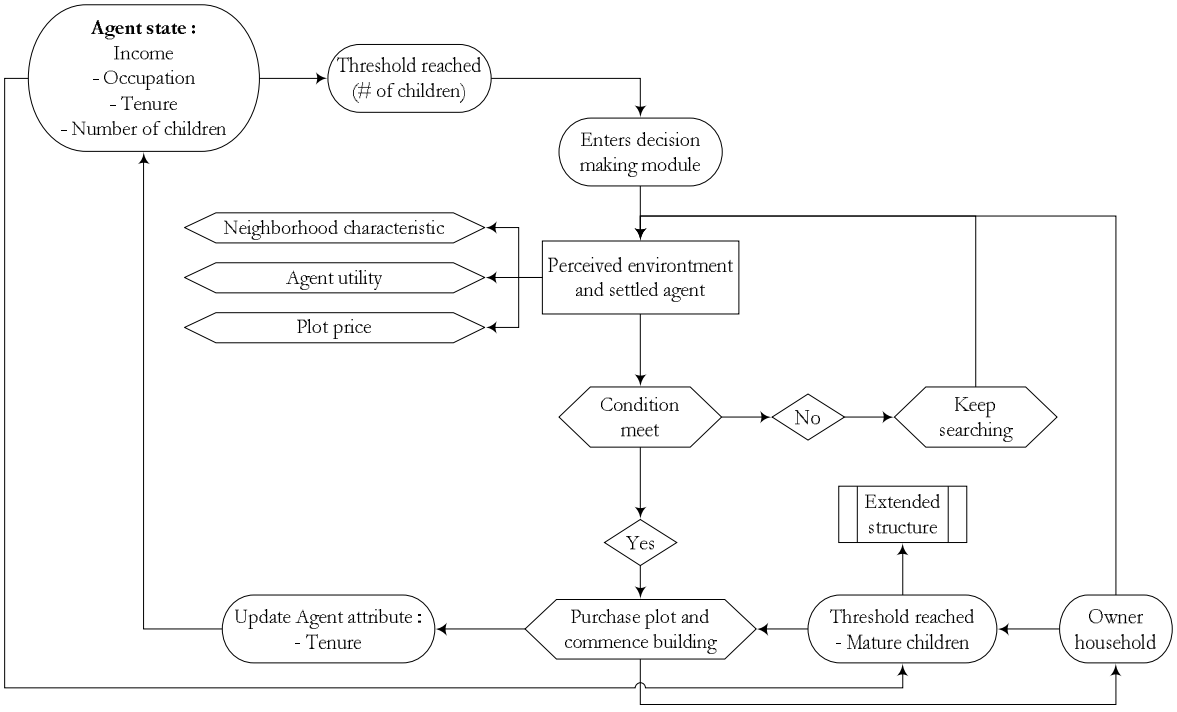


Figure 2-6 Micro-level agent transformation and decision making modules (Young, 2010)

3. RESEARCH METHODOLOGY AND TOOLS

This chapter discusses the methodological approach used to answer the research questions in order to get the main objective of the research. Both qualitative and quantitative methods were used to analyze the data and information gathered in the field. A Hanna Nassif informal settlement in Dar es Salaam was chosen as a study area.

3.1. Research process

For this research the methodology will be applied in fieldwork data collection included household interviews, key informants interviews, field observation, photographic and documents analysis in order to provide information on the phenomenon of study base on the research objectives. In order to conduct the proper fieldwork, it required:

1. Pre-fieldwork phase, in order to get initial information about case study area and certain aspects which needed in the field. This will help to understand and recognize about the study area and problem under investigation.
2. Fieldwork phase where the data is collected in the study area.
3. Post-field work phase, analysing the data collected is done to achieve the research objectives.

3.1.1. Pre-field work phase

Since the study focuses on the interaction among household in the housing process, this stage elicits the kind of interaction in the study area and the actors involved in the process. This data was gathered from the published literatures like journals, books, and articles. From the literature it was found that the common housing process in study area was unconventional or informal modes which involve some parties in the process.

3.1.2. Fieldwork phase

The fieldwork was conducted in Hanna Nassif, Dar es Salaam. Hanna Nassif settlement is in Kinondoni Municipality and around 4 kilometres from the CBD of Dar es Salaam City. Hanna Nassif is one of the oldest informal settlements in Dar es Salaam which surrounded by Kinondoni and Mwananyamala planned housing areas on the north and eastern sides and bordered in the south and western sides by Msimbazi creek. The main land use in the Hanna Nassif is housing for residential purposes Hanna Nassif is around 50 hectares with 5.045 households living in this area in 1.897 houses and about 31.883 people. At first Hanna Nassif is a coconut plantation owned by someone named Hanna Nassif and in the early 1970s because of the Land Nationalization Policy (Kombe, 2000) this area become distributed among population. Former labourers at the plantation who had been earlier permitted by the lease holder to erect temporary houses in the farm was initially build their houses illegally and sell the land they occupy to the newcomers. Depending on the size of land they occupy in the beginning or for those who bought the land, then they divide their land and sell it to others, this is of course going with no formal pattern (Kombe, 2000).

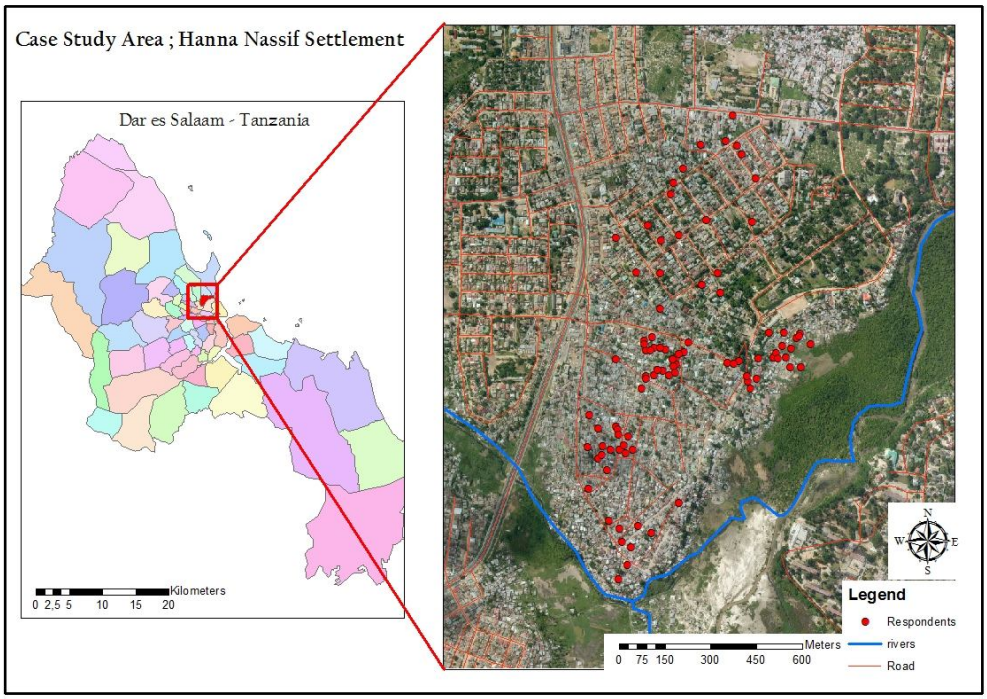


Figure 3-1 Case study area

Household questionnaires and interview were held in the study area. Some interviews were also conducted in order to get more information from local communities' leader (Ward and sub-ward) and with the key informants during the field work to get in-depth understanding of local communities' perceptions, opinions and experiences. Due to the data collection the initial contacts were facilitated by supervisors from Ardhi University and a student from Ardhi University who have experience and local knowledge about the study area. Some interviews were conducted in order to get more information from local communities' leader (Ward and sub-ward) and with the key informants during the field work to get in-depth understanding of local communities' perceptions, opinions and experiences.

3.1.3. Fieldwork process

The implementation of fieldwork carried out from 20 September until 8 October 2010 in the study area. Effective time in the required field data collection in general is for 11 days given the time constraints and the allocation of time for administrative proceedings. Data collection was done on 23, 24, 25, 27, 28, 29, 30 September, 1, 4, 5 October 2010.

One of the obstacles in the field was a matter of language, since the study area is an informal settlements in which most of the population come from low and middle class that use of local language *(Kiswahili)* in their daily life. In the implementation of this data collection I was aided by a translator because the whole process in the field was using the local language. Given the overall respondents who were interviewed do not speak English, then the existence of interpreters as a research assistant was very helpful in carrying out the process of collecting primary data. The questionnaire was not translated in local languages, but translators in this case asked the respondents based the questionnaire by using local language.

From the results of data collection in the field for 11 days gained as much as 95 respondents consisting of 56 women (59%) and 39 men (41%) respondents. The larger number of female respondents than men was due to the time of the interview in the working day in which the head of the family in this case the men

were working. Of the total respondents who were interviewed as many as 75 respondents (79%) obtained the status of the owner and 20 subjects (21%) were renters.

3.1.4. Post-field work phase

All the data processed with Statistical Package for Social Science (SPSS) in order to find the affected variables to answer the research questions. Analysis was involved cross tabulation of various variables to produce and interpretation of various tables, graphs and charts. The data collected from household surveys to be included in SPSS worksheet for analysis. Data entered into SPSS spreadsheets should be given an appropriate encoding and data types for statistical analysis.

3.2. Research design

In an analysis of social interactions, the things that want to examine are the socio-economic, socio-cultural, inter-actor linkages in accordance with the stages of the housing process in the study area which is characterized as informal settlements and also the internal factors that exist in study area.

To investigate the objectives of this research some case study approaches have been adopted such as household questionnaire, interviews and observation of the study area. Those approaches will help to know what kind of interaction exist in the study area and also who are the actors involve in the social interaction during the housing process since this study is aimed to describe social interaction in the context of an informal settlement process. This requires an approach that will allow me to collect, document and analyze the social interaction that occurs in housing process.

3.2.1. Unit of analysis

The main unit of analysis in this study is the household, given the key factor in choosing and making decisions about the appropriate unit of analysis is to decide what unit of analysis will be able to give something at the end of the evaluation. The survey, conducted in the area of study aims to determine the actors who interact and process involving the interaction occurs. As the primary unit of analysis is household who are the main actors in this interaction process. Questionnaires and interviews conducted to determine the information and background of the respondents in both the social context of economic and other general information is required. In general, information that will be excavated from the household is to know the characteristics of the household as the main agent in the process of interaction to be studied. The characteristics of the households will be seen the patterns, relationships and character to the formation of interaction between the actors on the aspect of housing process.

3.2.2. Validity and reliability

Sheuya (2004) mentions three methods perform validity checks, the use of various sources of evidence; establish chain of evidence and key informants provided an opportunity to go through the draft report. Because of the main data are the household respondents, so in order to construct the data validity we try to use graduate research assistants during the fieldwork who have local knowledge about the study area and made some quality control during the data collection by crosscheck the collected data with research assistants to review the progress and the answers. (Sheuya, 2004).

3.3. Data processing and analysis

Analysis and interpretation of data will be prepared in accordance with the questions asked in the field, the concept from the literature and input or new things obtained from respondents. Data collected were analysed using Statistical Package for Social Science (SPSS) and throughout the analysis, data were

differentiated regarding actors' roles and responsibility in housing process in understanding the collective actions and socio-ties potential for the study purpose.

3.3.1. Data Coding

In general, the codification of the data and information gathered will be focused on two aspects in order to get the main idea about household characteristic and social interactions that occur in the housing process conducted by households. Characteristics of the household will be assessed related to socioeconomic conditions, behaviour of saving, ownership status, length of stay, place of origin and environmental conditions. These household characters will be associated with a form of household activity in the housing process and form of interaction occurs as well as actors involved in every stage of the housing process undertaken by the household. Thus, three aspects of output will be analysed for the next step that is characteristic of household, the activities carried out and the actors who are involved in every step of housing process.

Data coding will be selecting existing data to see the domination of the household characteristics and determine the extent of interaction in the study area. At this stage it can be seen that the dominant issues of character and interaction of existing household in the study area. Process analysis is generally done by describing and showing the pattern of frequency of variables such as socioeconomic conditions, ownership status, activities conducted as well as anyone involved in the housing process undertaken by respondents. By knowing both the dominant aspect within the context of respondents as well as interactions that occur in the process of housing activity that occurs will be able to answer questions about the interactions that exist in the study area and who is involved in the process of housing.

3.3.2. Identify data relationship, pattern and characteristic

In the analysis, data will be differentiated base on the role and responsibility of the actors involve in the housing process. This helps in understanding of collective action and social-bonding potential for understanding the housing process in the study area and the actors involve in it. In this stage the main ideas are to identify the main actors who involve in the housing process, the stage of housing process which triggers the interaction among actors and the factors of interaction which affected the housing process.

3.3.3. Interpretation data on the main research objectives

General character in the pattern of initial accommodation in the city, including staying with relatives or friends, renting accommodation or move directly into their own homes in informal settlements (Smit, 1998). Substantial scope includes the study of the extent of social interaction in the process of housing characteristics associated with informal settlements which of course involves several actors in the process. Primary survey intended to obtain data from direct observation to determine the level of understanding of community with interviews, a questionnaire distributed by dividing the observed areas in accordance with the character and density of the region, it is considering each sub-region has a population density function and different.

3.3.4. Updated existing conceptual model

At this stage, the existing conceptual model will be developed based on information and analysis carried out to incorporate aspects of interaction and possibly other inputs such as the involvement of new actors in the housing process of informal settlements.

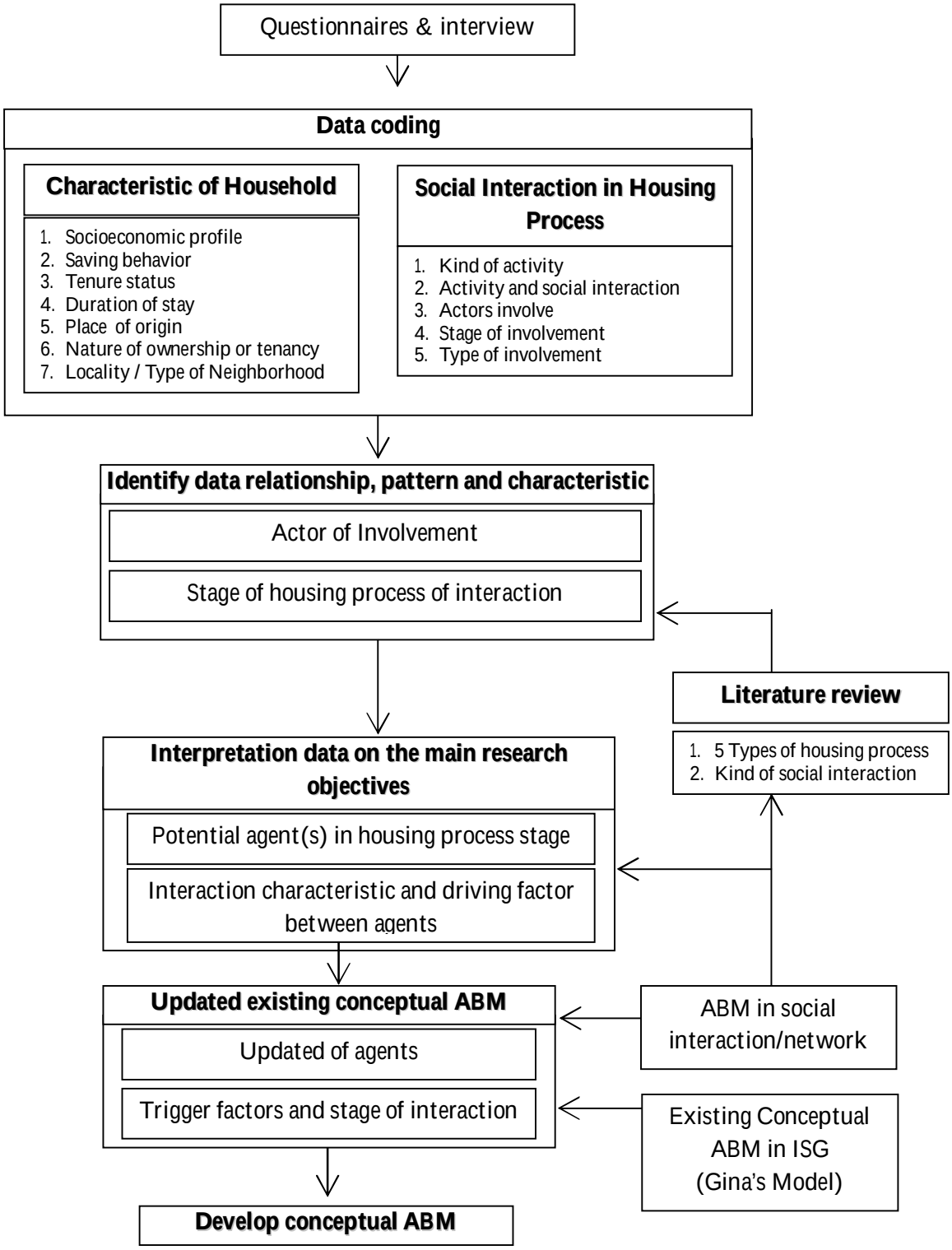


Figure 3-2 Framework analysis

4. INTERACTION AND HOUSING PROCESS

This chapter presents the results of fieldwork data collection. It discusses the socio economic profile of the respondents, push and pulls factors of respondents mobility, housing construction and acquisition and process activities and the interaction during the housing acquisition process

4.1. Characteristic of the respondents

By understanding the character of the respondent, it will obtain rich information about the main actor in the housing process and it can help in develop a reference in preparing their relation in the housing process. Given the survey conducted in the area that has characteristics of a diverse characteristic, so as to know the aspects and the main character of the respondents the selection of data and information collected in the survey have been made. The characteristics of the respondents could be classified in several main characters, namely socio-economic profile, land tenure, and the type of environment. By knowing the character of these respondents it will be expected to find patterns and interrelationships of each character and the interaction between them in the housing process.

By knowing the character or the profile of the respondents in the study area and the character of the interaction that occurs during the housing process, it will be useful to see the pattern, character and the existence of interactions that occur in the housing process in the study area.

4.1.1. Type of neighbourhood

Conditions in the study area in general can be differentiated into 3 general characters of neighbourhood, namely the planned, central, and valley neighbourhood. The planned neighbourhood is the region that was once planned as part of housing program conducted by the National Housing Corporation (NHC) and located in the north part of study area. The central area is considered as the inner and old area which is quite dense and the valley neighbourhood is generally characterized as a flood prone area located along the Msimbazi River flood plain. The division of the study area can also be seen from the housing type, activity and density of buildings in the study area. Another thing that can also be considered on the basis of locality is the profile of respondents such as the educational status, monthly income, type of tenure status, and the process of land / house acquisitions.

From the observation in study area, there are two types of houses found in the study area. The central and valley areas have predominantly *Swahili* houses (fig. 4-1) and the planned area has NHC houses type (fig. 4-2). *Swahili* houses can be defined as a house with a central corridor that leads from the veranda overlooking to the backyard. Along the veranda there are rooms on both sides of the veranda and in backyard usually have separate other buildings like a kitchen or latrine. A common Swahili house type in study area consist of 4 - 6 rooms along the corridor and have the kitchen or latrine separately in the backyard of the house.

Another thing that also distinguishes between these three areas is the condition of road infrastructure. The condition of roads in planned area is relative well planed, wide and very rare of the narrow alleys. As for the central area of the main roads are quite good and wide as part of the upgrading project, but the high building density restricts access in most parts to narrow pathways or alleys between the buildings. Conditions are very different in the valley area where the access is solely via pathways or small alleys.

Figure 4-1 Typical Swahili house (source; Sheuya (2007) and fieldwork)

Figure 4-2. Typical NHC's housing projects - fieldwork

Based on the respondents length of stay in each neighbourhood indicate that the valley area is relatively a new area compare to the other two areas. Most of the respondents in Valley area are staying around 5 – 25 years while in the other two area most of them have stayed more than 25 years. From the figure below, the central area also have a relatively even distribution of respondent's length of stay and in planned area most of them are stayed more than 25 years. The majority of the respondents in planned and central area are moving to the site before 1980's and in valley area most of them move to the site around 1990's or 2000's.

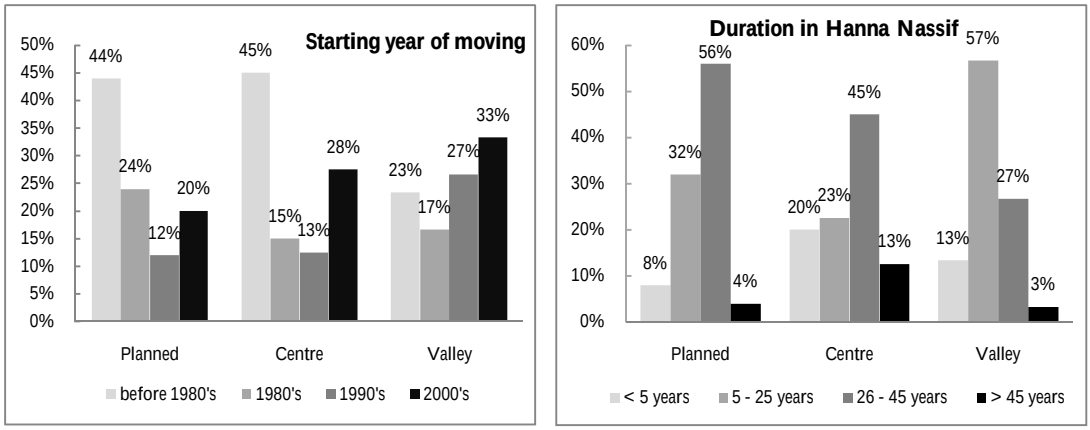


Figure 4-3 Duration in Hanna Nassif based on locality

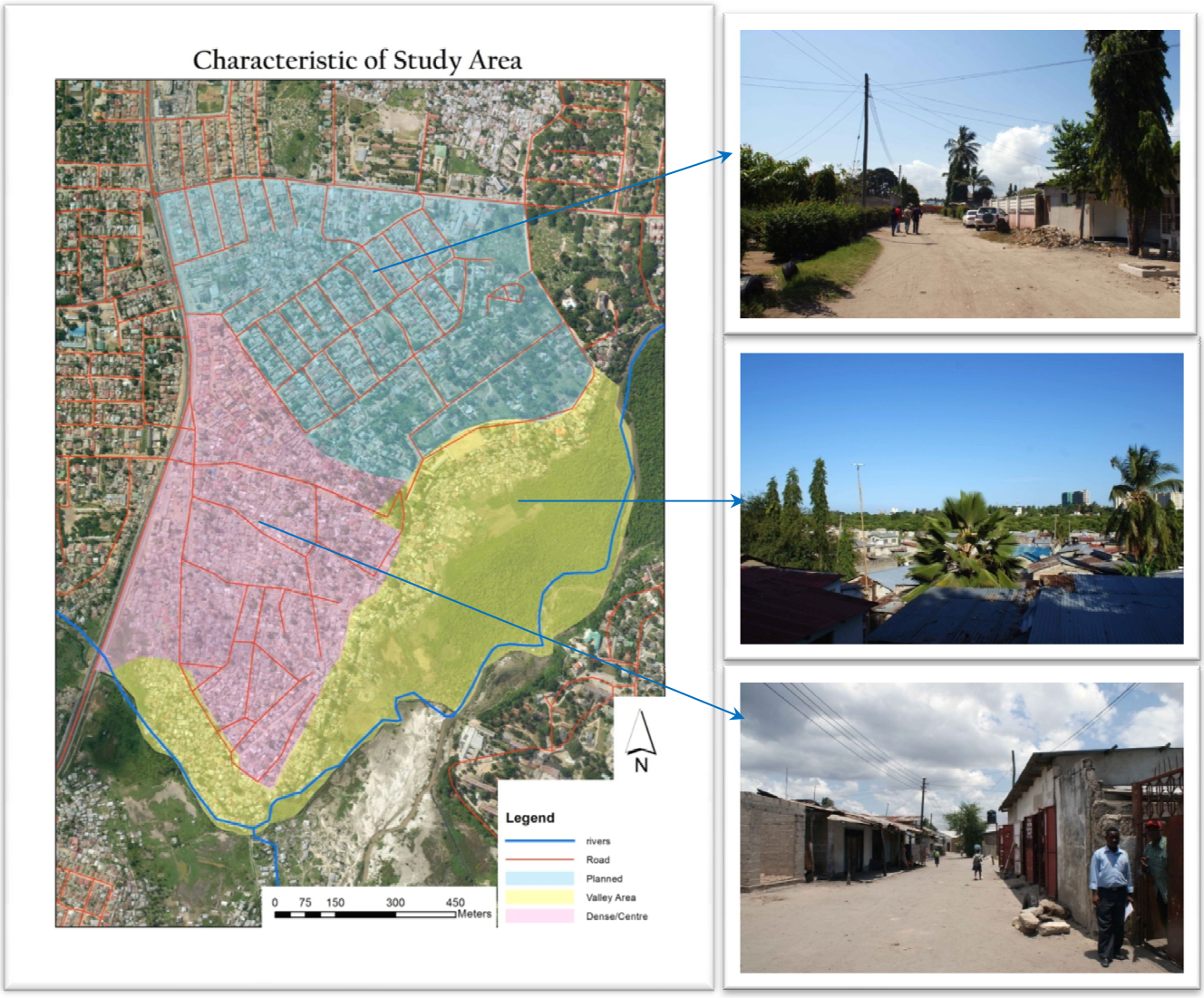


Figure 4-4 Different situation of study area base on the character of the study area (1. condition in planned area, 2. condition in the valley area, and 3. condition in central area)

4.1.2. Basic demographic profile

Demographic characteristics describe the population structure of study area based on age, gender, level of education and economic conditions. From total 95 respondents consisting of 56 women (58,9%) and 39 men (41,1%) respondents who are dominated by the respondents aged between 25 - 45 years and 46 - 65 years. Majority of the respondents are married (64%) and 27 respondents (29%) were widowed/divorced and only 7 respondents were single. Among the widowed respondents most of them were female respondents (22 respondents). The respondent highest education levels are dominated from primary school (47 respondents), secondary school (26 respondents) and no school (13 respondents).

Given the differences in the character of the area in the study area, the grouping of respondents carried out to see the existing pattern of each of these different areas of study. Observations and the cross tabulation results show the difference character of respondents for each difference neighbourhood which indicates the differences in educational level. In the valley area, the respondents generally have lower education levels compared to two other areas. Although this is not so significant considering the average education level of respondents in the study only reached the primary school level. A significant difference was found in the planned areas in which the education levels of respondents are dominated by secondary education (Annex).

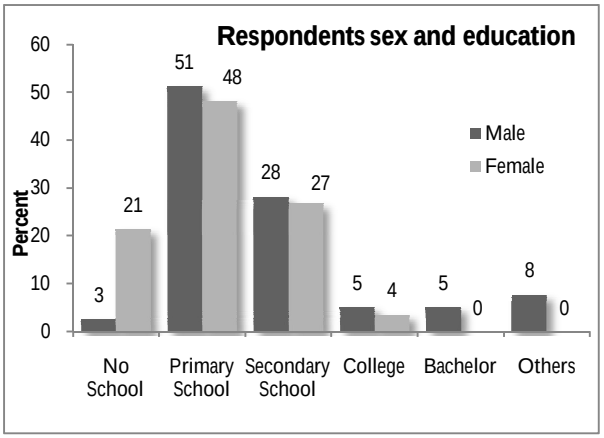


Figure 4-5. Respondent's education level and gender

4.1.3. Household income and occupation

Of the total respondents (95 questionnaires), most of the respondents (54 respondents) are working as a self-employment who mostly have a monthly income > 90 000 TShs (57%). From the type of respondents' occupation, there are no correlation between the neighbourhood and the type of respondents' occupation, given in the three different neighbourhoods the majority of respondents worked as self-employment (Annex). It is quite surprising to find that the average monthly incomes of most respondents are > 90 000 TShs in the study area. In general, the income level for majority of respondents ranged between 50,000 to 90,000 shillings (89%), whereas in valley area there are no significant different in the income level among the respondents since the income level spread evenly in almost all the income level. Meanwhile in the planned area the majority of respondents (76%) have income >90.000 TShs (figure 4.6).

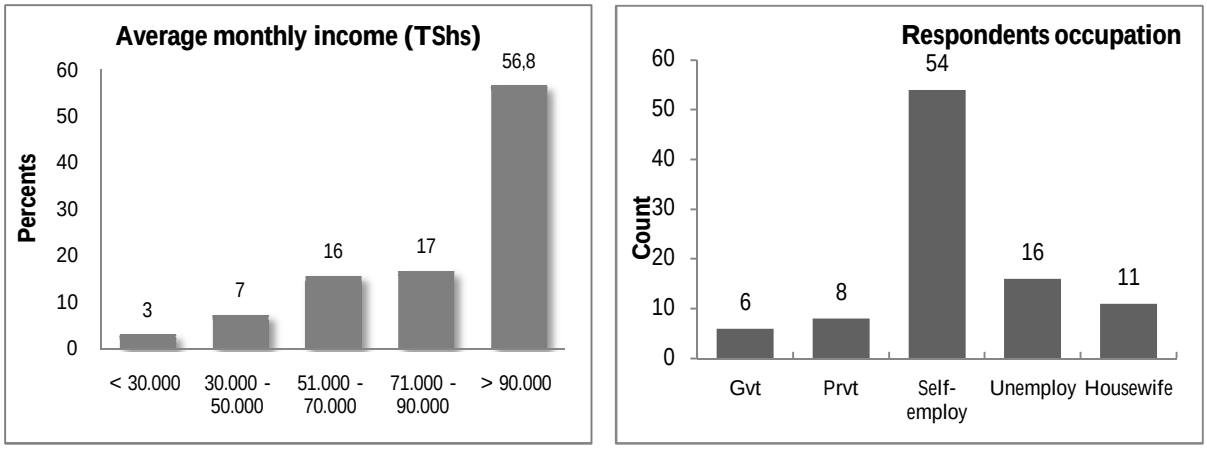


Figure 4-6 Respondents monthly income level and occupation

4.1.4. Respondents tenures status

Of the total respondents who were interviewed as many as 75 respondents (79%) are owner and 20 respondents (21%) are tenants. In the following table are presented the distribution and general description of respondents. Based on the characteristic of study area, majority of the houses in Hanna Nassif are owner and as for the rent-paying tenants usually pay monthly rent between 15.000 – 45.000 Tshs/mth. Since this area is an oldest informal settlement in Dar es Salaam, the majority of elderly respondents are the owner of the house and have settled more than 25 years and tenants usually are settled in the area not more than 25 years.

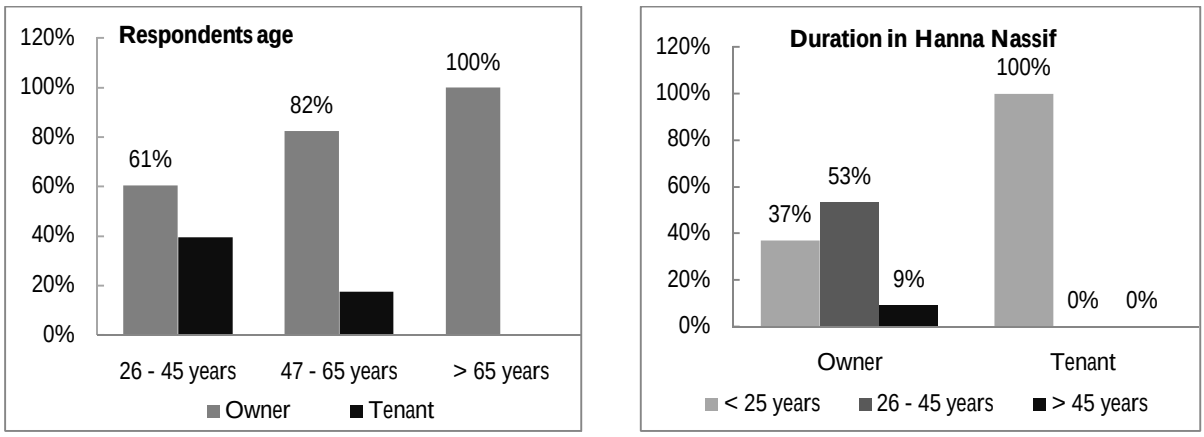


Figure 4-7 Respondent age and length of stay based on tenure status

4.1.4.1. Owners profile

The survey identified the majority of the owner respondents have a legal title that show their ownership of their land or house. Among 75 respondents who are owner in the study area, only 3 respondents said they do not have any legal title in which 1 respondent is a squatter since 1974 while the other two respondents only have an agreement while the bought the land from the owner and a property tax receipt from municipality. However these three respondents do not have any legal title for their property, but the feel secure since they have live there for a long time and have build a permanent house. One of the respondents who have a property tax receipt said *"I feel good as the government knows that this is my property and they collect property tax or it (Respondents #79 have stayed since 1960)"*

Type of the title status from the owner are ranging from registered title namely Certificate of Occupancy, temporary letter of occupancy, residential license, purchase receipt and agreement with the former owner witnesses by the neighbour and local leader. Certificate of occupancy was given by the Tanzania Government under the Land Act, 1999 and given to the people after their land have been surveyed. Meanwhile, the temporary letter of offer is a kind of letter in which the government have been surveyed their plot and this letter is a requirement to get the certificate of occupancy. The Residential Licences was originally intended as the government's efforts to improve the standard of living as well as to identify personal property among the people and also can increase the government revenue from property tax in which the Government of Tanzania launch a Comprehensive Urban Land Property Register for Economic Empowerment of Residents in Unplanned Settlements in Dar es Salaam Project. This program known as Residential License Project based on the Land Act 1999. This program is a derivative right in which the houses in informal settlements were surveyed as long as they did not occupy hazardous land or restricted area such as land reserved for public utilities. This program realized that most of the people in most informal settlements in Tanzania were landholder and they have lived on that land for many years without any official recognition.

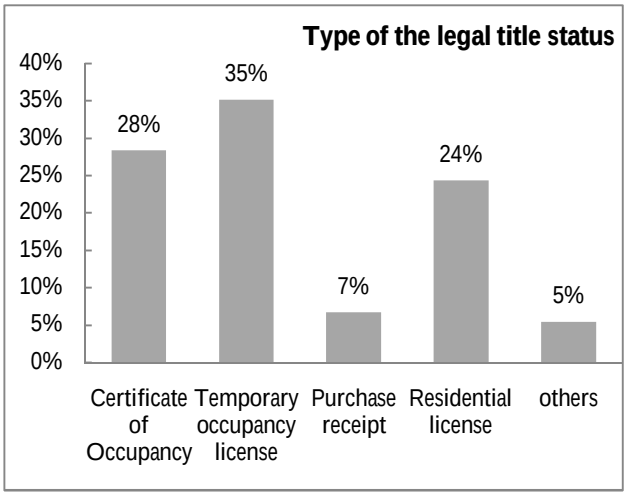


Figure 4-8 Type of legal title

From the survey it was found that the majority of land acquisition (89%) was conducted through informal means, while most of the house acquisition conducted in formal way. Majority of the respondents (59 respondents) are using informal modes in their access to housing and 15 respondents (20%) conducted formal modes. In order to know the characteristic and this condition of formal and informal mode of provision among respondents, the cross tabulation indicate the formal mode of housing provision mostly found in planned area, since this planned area was considered as a planned area which part of the National Housing Project.

Base on the neighbourhood condition, there are some different in the legal title among respondents. Majority of the respondents in planned area (67%) possess a Certificate of Occupancy as their legal title status of their property. While in the valley area, none of them possess the certificate of occupancy and majority of them only possessed residential license (60%) and purchase receipt (30%). The even distribution of legal title possession among respondents was found in the central area. In the central area almost all the type of legal title possess by the owner.

4.1.4.2. Tenant profile

The reason of the respondent to choose Hanna Nassif as a place to rent a house are because of the lower price (35%), no other choice (30%), close to work place (20%) and close to relatives or friend (15%). Based on the cross tabulation between their reason and their previous place of tenancy, there are sa significant differences between respondents who already stay in Hanna Nasif and respondents who came from outside Dar es Salaam.

Kinship relations between tenants and home owners look to be a major factor in the valley area. Nearly half of respondents who become tenants in the valley occupy their family/relative's or their friends'

houses. This condition is different in the two regions, where they rented a house directly from the owner. Meanwhile, based on the tenant respondent's monthly income, generally their income were > 90,000 TShs/Month, but in the valley area seem to be fairly significant income distribution among the respondents (Annex).

Table 4-1 Reason to select Hanna Nassif for rent/house

Location of previous tenancy		Reason to select Hanna Nasiif for rent				Total
		cheap	close to friends or relatives	close to workplace	other	
within Hanna Nassif	Count	4	2	1	1	8
	% within Location of previous tenancy	50,0%	25,0%	12,5%	12,5%	100,0%
within Dar es Salaam	Count	2	0	2	2	6
	% within Location of previous tenancy	33,3%	,0%	33,3%	33,3%	100,0%
outside Dar es Salaam	Count	1	1	1	3	6
	% within Location of previous tenancy	16,7%	16,7%	16,7%	50,0%	100,0%
Total	Count	7	3	4	6	20
	% of Total	35,0%	15,0%	20,0%	30,0%	100,0%

4.1.5. Saving behaviour

The level of income and tenure status of respondents related to the tendency of respondents to save. 56 of the respondents (59%) have a savings account for a variety of reasons. Judging from the level of income that varies with the grouping of respondents, it is not surprising that respondents with incomes> 90,000 TShs generally save their money. Based on their ownership status, there are differences in behaviours between owners and tenants in terms of saving behaviour and their saving purposes. Majority of tenants have savings accounts (18 respondents) and only 2 tenant respondents did not have saving account. While the owner respondents indicate the tendency of the relatively low savings habits, among 75 owners, 37 did not have saving and 38 have saving account.

Educational purpose, housing construction and business were is the majority purpose of saving among the respondents, because among the 56 respondents who save their money, 31 respondents save their money for the educational purposes, 20 respondents saving for housing construction and 17 respondents for the business purpose. However, there are also difference behaviours among owner and tenant respondents in their saving purposes. Most of the owners tend to save their money for the education purpose while the majority of tenants said the save their money for the housing purpose (Figure 4.9).

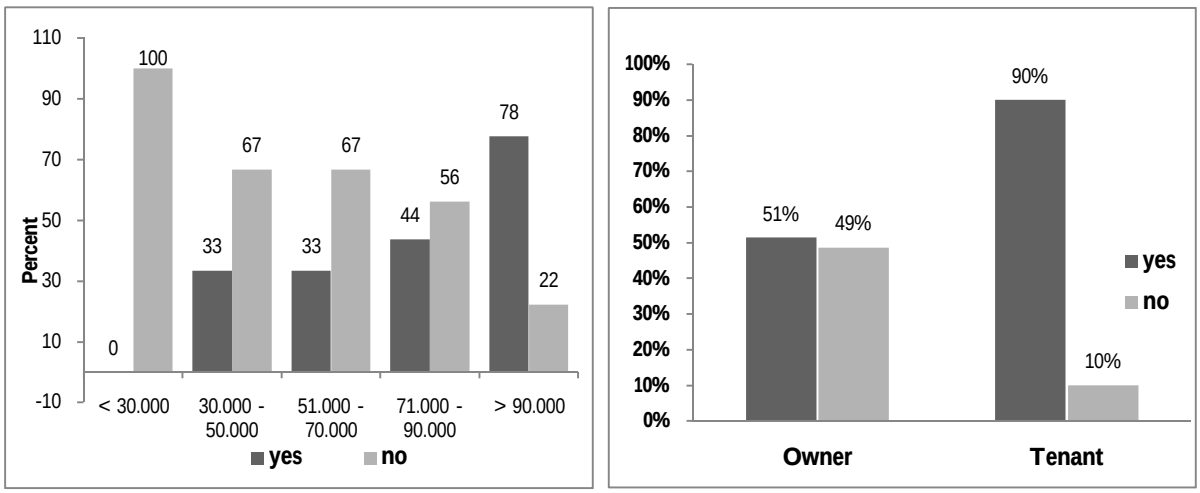


Figure 4-9 Respondents monthly income level and saving condition

4.1.6. Place of origin and previous stay

Majority of the respondents (70 respondents) come from outside Dar es Salaam which means most of them are immigrants from outside the city of Dar es Salaam (74%). While most of the immigrant from outside Dar es Salaam came to Hanna Nassif before 1980's (29 respondents) and 24 respondents came around 1980's - 1990's. Among the 5 respondents who originated come from Hanna Nassif, 2 of them were directly bought their land from Hanna Nasif itself and one respondent bought the land in 1970's from the owner who sub-divide his land and sold the land to the respondent as much as 550 TShs.

From the table below, majority of the respondents came to Hanna Nassif before 1980's (40 respondents) and 25 respondents came in 2000's and in valley area was dominated by people from outside Dar es Salaam. Based on the arrival process shows the majority of respondents are generally stayed for a while in Dar es Salaam before finally settling in Hanna Nassif settlement. Base on the respondents previous stay before moving to Hanna Nassif, the composition of respondents in the central and valley areas show the respondents who move inside the study area are relatively high compare to the planned area.

Table 4-2 Place of origin and resident of Hanna Nassif

Place of origin		Resident of Hanna Nassif since				Total
		before 1980's	1980's	1990's	2000's	
within Hanna nassif	Count	3	0	1	1	5
	% within Place of origin	60%	,0%	20%	20%	100%
within Dar es Salaam	Count	8	3	2	7	20
	% within Place of origin	40,0%	15,0%	10,0%	35,0%	100%
outside Dar es Salaam	Count	29	12	12	17	70
	% within Place of origin	42%	17%	17%	24%	100%
Total	Count	40	15	15	25	95
	% within Place of origin	42%	16%	16%	26%	100%

4.1.7. Duration of stay

The survey also showed that residents who lived in Hanna Nassif is a resident who has lived more than 25 years in which almost half of the respondents (40 respondents) and most of them come from outside Dar es Salaam. From the observation by taking into account the character of the neighbourhood, there is a difference character between the valley area and other areas in the study area. The different characteristic of the neighbourhood were also seen affecting length of stay of the respondents. Where the valley region can be regarded as newly developed residential areas as part of an extended process. On average, people living in the valley region are dominated by residents under 25 years old.

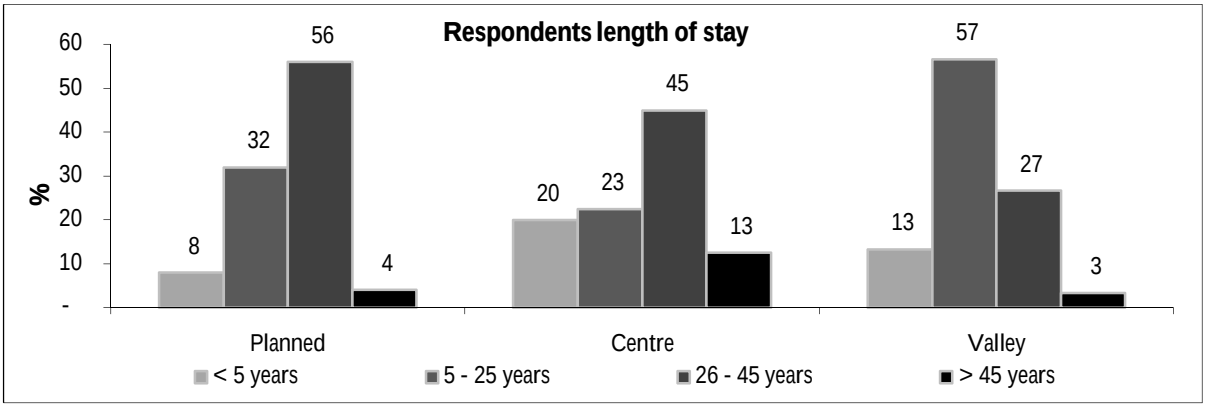


Figure 4-10 Respondent's length of stay in Hanna Nassif based on locality

4.1.8. Summary

The mean age of the 95 respondents is about 52 years, the oldest respondents were 82 years old and the youngest was 24 years old. 61 respondents (64%) were married, with only 7 respondents being single and 27 respondents were widowed. All the respondents have some forms of formal education: majority of them had primary school education (50%), 26 respondents (27%) attended secondary schools and 13 (14%) never attended to school and only 6 (6%) admitted to having attained a college/bachelor education. Most of this sample population are self-employed 54 respondents (57%) whereas 6 respondents (6%) work in government sector and 16 (17%) were unemployed. Based on the survey, the oldest settler was coming to Hanna Nassif in 1957 which started the house erection in 1956. And the new settler was coming in 2010 (Table 4-3).

The characteristic of neighbourhoods give different condition of respondents in the distribution of income level, the respondent's duration of stay and the education level distribution among respondents. Based on the observation and the income level condition, the valley area was considered as a new area and with the majority of the population characterizes as a low income residents. Valley area has high dense building and their development seem not to follow any planning guidelines as they are irregular in pattern with very narrow pathways as the main access in the area. A few mud houses were also found in this valley area. While the others two areas were most of the respondents seems to have a good condition, both in the environmental and economic condition since the majority of income level were >90.000 TShs/month and have good road infrastructures. Majority of the houses in these two areas are permanent house and have a relative big plot, especially in the planned area.

The main reason of the respondent for saving their money was for educational purpose. Base on the observation, most of the respondents who have saving account were saving their money for educational purpose and for the tenant respondents' majority of them (90%) save their money for the housing construction. This saving behaviour among the respondents was seemed to be relatively different based on their condition of ownership. Among the plot owner respondents (75 respondents), 38 respondents were saving their money and most of them (24 respondents) save their money for educational purpose, meanwhile among 18 tenant respondents, 9 of them (50%) save their money for housing purpose.

The respondents are largely comprised people from outside Dar es Salaam (74%) such as from Coast Region (10 respondents), Morogoro (12 respondents) and Kilimanjaro (12 respondents). Only 17 respondents were come from Dar es Salaam and 5 respondents were originally from Hanna Nassif. The first place of the respondents before they settling in Hanna Nassif were mostly around Dar es Salaam and 40 respondents (42%) have already lives in Hanna Nassif before 1980's.

Table 4-3 Descriptive Statistics of respondents

Items	N	Minimum	Maximum	Mean	Std. Deviation
Respondent age	95	24	82	52	15,635
Resident of Hanna Nassif since	95	1957	2010	1985	15,506
Starting year of moving to new house	71	1957	2009	1981	12,763
Starting year of housing erection	70	1956	2009	1979	11,914

4.2. Push and pull factors

4.2.1. Reason to Hanna Nassif

Family factor or kinship are the dominant factor as a reason of the respondent to choose Hanna Nassif as their place to live along with the price of the land is cheap and most of the respondents think this area is a

good area to live. As shown in table below, the three main reasons of the respondents to choose Hanna Nassif were 29 respondents (31%) said they come to Hanna Nassif because of the family reason, 22 respondents (23%) because of Hanna Nassif is a good area, and 18 respondents (19%) said because of the land price was cheap (Annex).

The interaction before the respondents decide to choose Hanna Nassif were also try to depict. This condition were reflected by asking the respondents whether they have already know people who live in Hanna Nassif before they decide to move in the study area. Majority of the respondents (74%) said they have known some people before decide to move to Hanna Nassif. Based on the relation with the people they already knew before moving to Hanna Nassif, most of them are their family or relative (53%) and friends (21%).

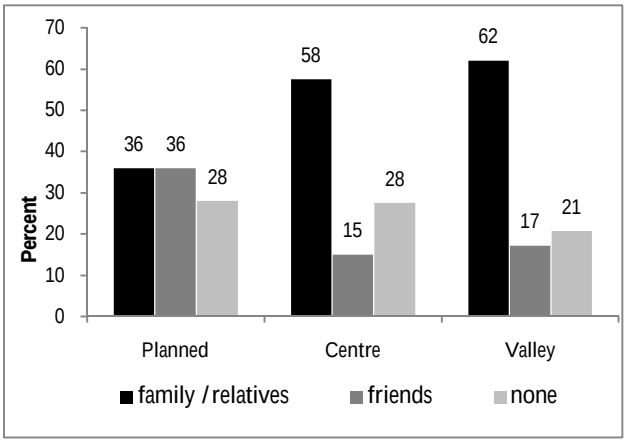


Figure 4-11 People already know before moving to Hanna Nassif

Base on the neighbourhood characteristic in the study area, there are some differences of each area associated with the status people they already known before moving to the area. Most of the respondents in central and valley areas were following their family or relatives who already settled in the area before they decide to move to Hanna Nassif. For example, a respondent #17 explicitly said, *"One of my family members was living in Hanna Nassif, that is why I also decided to live in Hanna Nassif."*

In order to know the reason of the respondent leaving their previous place, the respondents were asked about their reasons the factors of their previous place. The result indicated that they generally migrate from where they were previously due to the factor of a desire to improve their lives or because of family reasons. 47 respondents (50%) said they leave the previous place in order to improve their lives (better living) and 26 respondents (28%) said because of family reason such as married and follow-husband. There are no significant differences for the different neighbourhood in study area for the reason of leaving their previous place. Better living is the main reason for all of the respondents to leave their previous place in each type of neighbourhood.

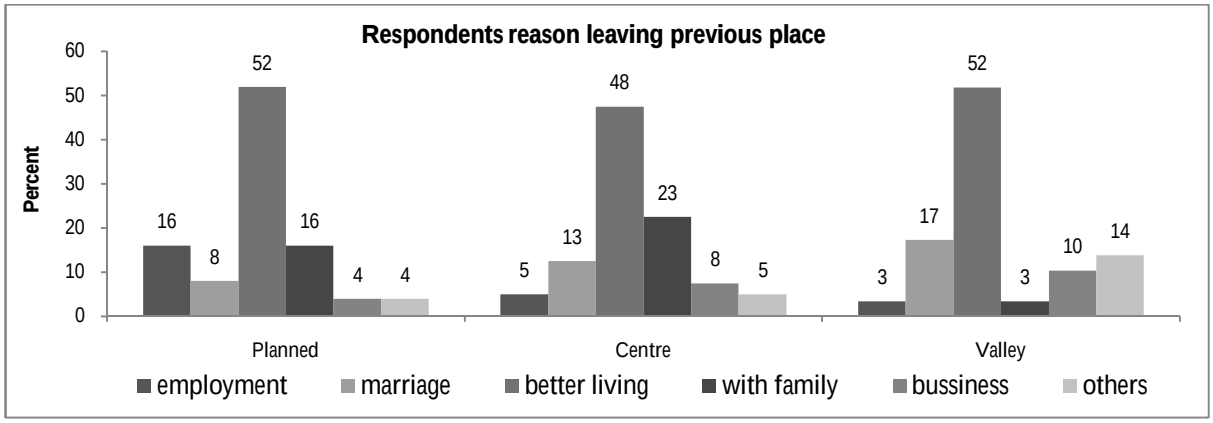


Figure 4-12 Respondent's reason leaving previous place

The respondents also asked about the reason why the choose Hanna Nassif as a place to live and did not choose other settlements, most of them of the respondents said because of kinship factor, relatively cheap land prices and a good place to live since the area near to the CBD. Whereas in the choice of locations in the Hanna Nassif as a last place for them to settle in general cause of the family factor for 29 respondents (30,9%), 22 respondents (23,4%) said because of good area/environment, and 18 respondents said because of the relatively cheap price.

The survey identified the differences of reason to choose Hanna Nassif as a place to live between three neighbourhoods. Majority of the respondents in planned area choose the place because of the area is good, since this area considered as a planned are and the NHC offer them a habitable house. One significant different between planned area with the other two neighbourhoods is the land price did not the main factor for the in choosing the place Meanwhile in the other two neighbourhoods, family or relatives' factor and the price of the plot are the main reason for them to choose Hanna Nassif as a place to live.

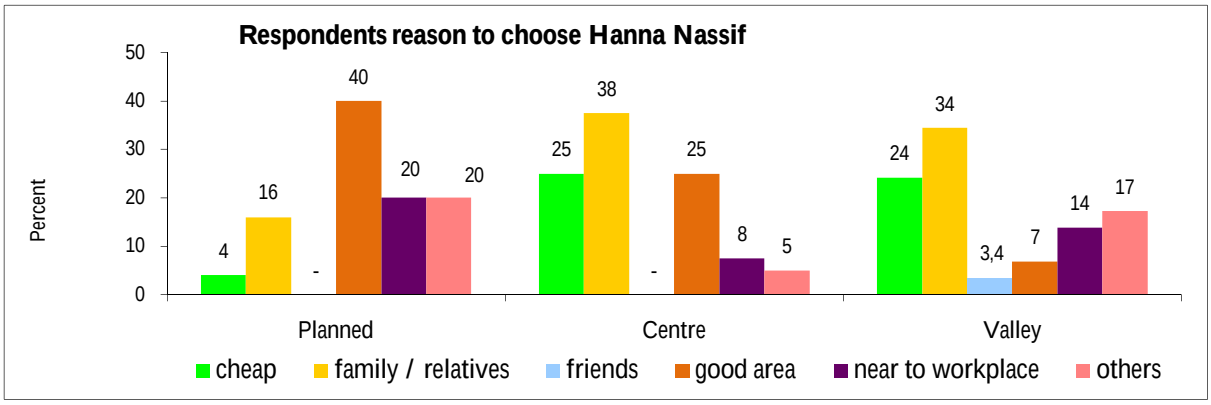


Figure 4-13 Respondent's reason to choose Hanna Nassif

4.2.2. Source of information

In order to know the interaction of the housing process, the respondents were asked about their source of information about the site or the house the want to stay as a tenant. In general majority of the respondents main source of information were family / relatives (35%), own search (24%) and friends / neighbours (22%). From the survey indicated that the main source of information for the respondents mainly from the people they already know such as family or friends (57%).

Table 4-4 Source of information

Tenure status		Source of information					Total
		own search	family / relatives	friend / neighbours	newspaper	other	
Owner	Count	21	27	18	1	7	74
	% within Tenure status	28%	37%	24%	1%	10%	100%
Tenant	Count	2	6	3	1	8	20
	% within Tenure status	10%	30%	15%	5%	40%	100%
Total	Count	23	33	21	2	15	94
	% within Tenure status	25%	35%	22%	2%	16%	100%

Majority of owner source of information are family / relatives (27 respondents) while for the tenants the main source were brokers or middle man (8 respondents) who helps them to meet the house owner. Base on the interview with the tenants, the middle man (brokers) help them as source information about the

availability of house in which they can rent. Associated with the housing process activities, most of the land acquisition process of respondents got the information by own search (36%), family (33%) and from friends (27%). House acquisition in other side shows different pattern of the respondent's source of information were others (brokers) (29%) and friends (29%). Whereas for the tenant respondents most of them got the information about the renting house from the brokers (40%) and from their family (30%).

Based on the neighbourhood character, family/relatives still the main source of information for the respondents in the three neighbourhoods. In planned area there were slight evenly distribution of source of information of the respondents, but one new source is reveal in the planned area that is newspaper as a source of information. In his case, there are two respondents who got the information about the plot and the house from the newspaper and the information the got about the program of NHC.

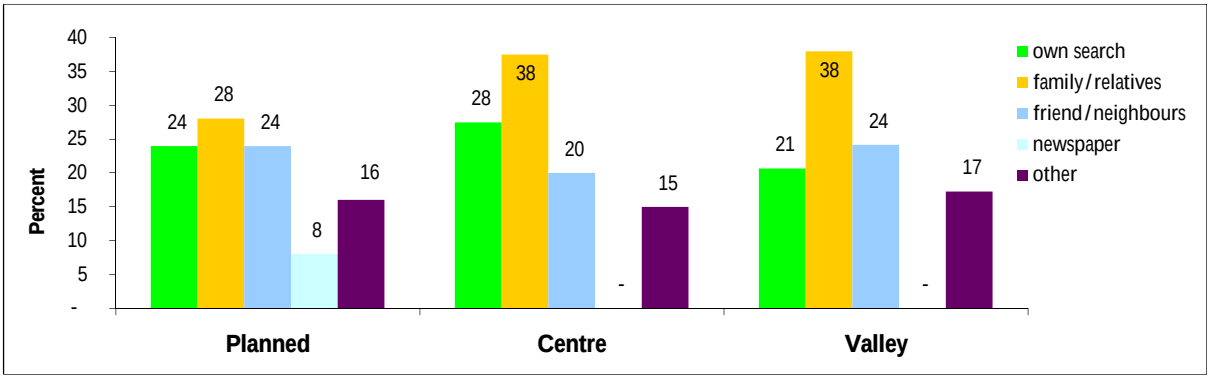


Figure 4-14 Respondent's source of information of plot based on locality

4.2.3. Social interaction

Survey results show that in general people still know many of their neighbours personally. In response to this question 67% of respondents said they knew 15 or more neighbours in person and 33% knew less than 15 neighbours. In order to know the interaction among respondents and other actors in the study area, the respondents were asked about people the usually asked for help if the have some problems. 76 respondents (81%) rely on the local leaders in order to solve their problems. In planned and central neighbourhoods majority of the respondents rely on the local leaders role for their problem solving in the neighbourhoods, while in valley area the role of friends and neighbours (24%) also have certain role in their problem solving.

Table 4-5 People usually ask as a mediator

Neighbourhood character		People usually ask as a mediator				Total
		relatives	friends/ neighbours	local leader	others	
Planned	Count	0	2	22	1	25
	% within Neighborhood	0,0%	8,0%	88,0%	4,0%	100,0%
Central	Count	3	2	35	0	40
	% within Neighborhood	7,5%	5,0%	87,5%	0,0%	100,0%
Valley	Count	2	7	19	1	29
	% within Neighborhood	6,9%	24,1%	65,5%	3,4%	100,0%
Total	Count	5	11	76	2	94
	% of Total	5,3%	11,7%	80,9%	2,1%	100,0%

4.2.4. Summary

From the result it was found that most of the respondents were coming from outside Dar es Salaam dan they leave their previous place in order to change their living condition in other word for better living condition. Family factor or kinship are the dominant factor as a reason of the respondent to choose Hanna Nassif since the majority of the respondents (74%) said they have known some people in Hanna Nassif before they decide to move. Most of the people they already know were their family or relatives (53%) and friends (21%).

Kinship factor, relatively cheap land prices and a good place to live are the main reason of the respondents to choose Hanna Nassif. The different between planned area with the other two neighbourhoods is the land price did not the main factor for the in choosing the place. Meanwhile in the other two neighbourhoods, family or relatives' factor and the price of the plot are the main reason for them to choose Hanna Nassif as a place to live.

Family or relatives were the main source of information for the respondents in the three neighbourhoods in the initial housing process. In order to get the information about the plot, house or the place to rent, majority of the respondents got the information from their family or relatives. But there were some differences in the tenancy process in which most of the tenant respondents got the information about the availability of renting house from middle man (40%).

4.3. Type of housing process activities

Housing process in the location based on a survey carried out consists of three forms of activities: land acquisition, purchased or inherited the house and the transformation of existing homes. Base on the observation during the fieldwork, most of the existing houses in study area were built with sand-cement blocks and roofed with iron sheets and only few was built with mud and pole. Majority of these mud and pole's houses were found in valley area.

4.3.1. Site selection or initial housing process

When viewed from the first access to house ownership in the study area, there are three the general pattern of ownership access exist namely; land acquisition, house acquisition, and others (eg. inherited, squatting, or given by employers). From the survey reveal that land acquisition is the majority mode of the respondents for their initial housing process. Of the 75 owner respondents, 46 respondents (61%) were bough a plot and build a house while 17 respondents (237%) bought the existing houses and 12 respondents got the plot/house from their family (inherited).

Table 4-6 Owner initial housing process

Tenure status	Initial housing process in Hanna Nassif			Total
	land acquisition	house acquisition	others (eg. inherited)	
Owner	46	17	12	75

Based on the neighbourhood characteristic, there are some differences for the initial housing process in each of the neighbourhood. In planned area most of respondents (48%) initial access to their house by buying an existing house which provided by National Housing Corporation (NHC). The land acquisition mode of access is dominated in valley area in which almost all the respondents (90%) bought the land as their initial access to house. The survey also indicate that in planned area majority of the owner got their property through formal process (67%) while in valley and central areas got the access to their property

through informal way. From the figure below it also show that most of tenant respondents are majority live in valley area.

Land acquisition is the major form of acquisition in valley and central areas, whereas the inheritance was the major form of land acquisition in central area compared with the other two areas. In the planned area, buying house was the highest mode of land acquisition. Buying a vacant plot was the major means of land acquisition in the area. From the table below it was found that most of the respondents (27 respondents) bought the vacant land before 1980's because at that time the price was cheap and still more vacant land at that time. Among the 27 respondents who bought vacant land before 1980's, 1 respondent bought in 1950's, 16 respondents bought in 1960's, and 22 respondents bought in 1970's (Annex).

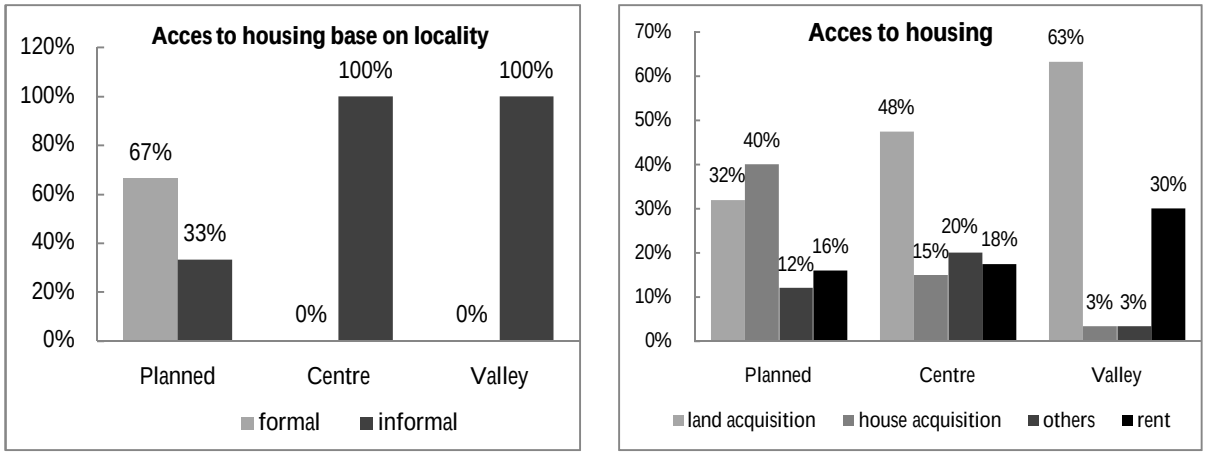


Figure 4-15 Owner respondent's access to house based on locality

Land acquisition is the main pattern for the respondents in their housing process. Most of the respondents are purchasing vacant land and gradually build a house. This process is more easily and quickly considering majority the purchases made through an informal process which is a common pattern in informal areas. Meanwhile, from the observation there are no significant differences in the pattern of access to house in every level of income group, but there are some slight differences in the pattern of housing provision in the high income respondents group.

Table 4-7 Ownership condition and year of settling in Hanna Nassif

Ownership condition		Resident of Hanna Nassif since				Total
		before 1980's	1980's	1990's	2000's	
land acquisition	Count	27	8	6	5	46
	% within Initial housing process	59%	17%	13%	11%	100%
house acquisition	Count	5	4	4	4	17
	% within Initial housing process	29%	24%	24%	24%	100%
others	Count	8	1	1	2	12
	% within Initial housing process	67%	8%	8%	17%	100%
rent	Count	0	2	4	14	20
	% within Initial housing process	,0%	10%	20%	70%	100%
Total	Count	40	15	15	25	95
	% Total	42%	16%	16%	26%	100%

The economic conditions of respondents and the character and pattern of access to house, indicate that land acquisition is the cheap and easy mode for most of the respondents with low income group. In general, respondents with lower incomes tend to choose to buy the land and gradually build the house in

the incremental process. While the respondents who have a fairly high monthly income generally carried out the home acquisition process whereas the pattern of inheritance is generally dominated by low income groups (figure 4.16).

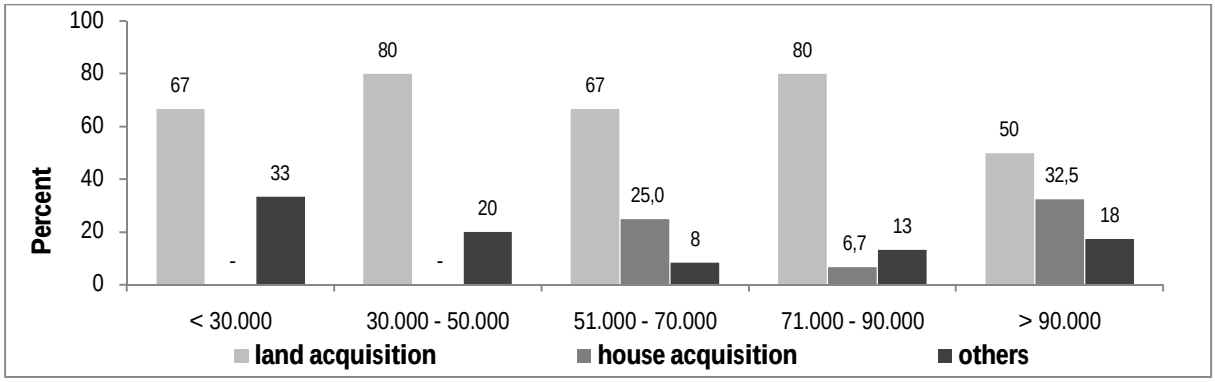


Figure 4-16 Respondents monthly income level and housing process

4.3.2. House construction

In the process of housing construction, most of the respondents (80%) construct their house in the duration of 1 - 2 years. They started to move to their house even though the house still in the basic condition. Of the 74 respondents interviewed about the process of their housing construction, most of their initial houses were build in the good condition with cement block for the wall material (47 respondents), cement floor (62 respondents) and iron sheet for the roof material (54 respondents). In the study area there are some houses build with mud and pole and gradually they improve the house condition. Incremental housing is the common feature of housing construction in the study area since this pattern can reduce housing costs and gradually ensures their dwellings will best for their needs.

Among the 75 house owners, 27 respondents for the first time build their house with mud and pole and at the time of the survey only 4 houses of respondents still build in the mud and pole material. Based on the interview it was found that 12 houses were having thatch material for the roof and when the survey conducted the roof have been change with iron sheet material. Most of the respondents said they have done some improvement with their house during the time for certain purposes and reasons.

Table 4-8 Duration of house construction

Duration	Frequency	Percent	Valid Percent
1 - 2 years	56	75	80
3 - 4 years	8	11	11
> 5 years	6	8	9
Total	70	93	100
Missing System	5	7	
Total	75	100	

The survey and observation in the study area found that among the respondents most of them construct their house during 1960's until 1980's. The majority of them erected their houses in 1970's (37%) with informal means of construction without any consultation and follow a regulation in housing construction. Base on the interview the construction process mainly done by themselves or by using a local labour *(fundi).* The processes itself were supported by the neighbour such as helping in transporting the material into the site or having some water during the construction from the neighbour water tap. In the process of

construction, the neighbours sometimes give some advices about the construction such as how to build the house due to the flood problem in the area.

4.3.3. House transformation

As we know that in the process of housing that occurred in the slum area in general begins with the pattern of incremental development. Residents generally build their houses in stages and gradually improve the house in accordance with the financial capacity and needs of their lives. In the study area in general it is reflected by the conditions in which most people build their house in an incremental way. The incremental building always follow even their initial houses were build in a good condition. Most of the main purpose of transformation is to accommodate the family members. In addition the process of transformation was supported by the availability of vacant land since most of the respondents have a big plot in study area.

As the first time of the owners occupied their houses, not all the houses build in a good condition. Some of the houses were built in a basic or even rudimentary condition. When the respondents were asked about the transformation of houses they have been made, majority of respondents (61 respondents) said they have made some transformation with their houses and 13 respondents did not make any transformation with their houses. Of the 61 respondents who made a transformation with their houses, 56 respondents constructed new rooms, 4 respondents replaced the temporary structures and 1 respondents mad an extension of the veranda. The main form of transformation of houses was constructing of new rooms (56 respondents) in order to accommodate their family members (43 respondents), renting (7 respondents), to improve house condition (5 respondents) and one respondents for the home base economic purpose.

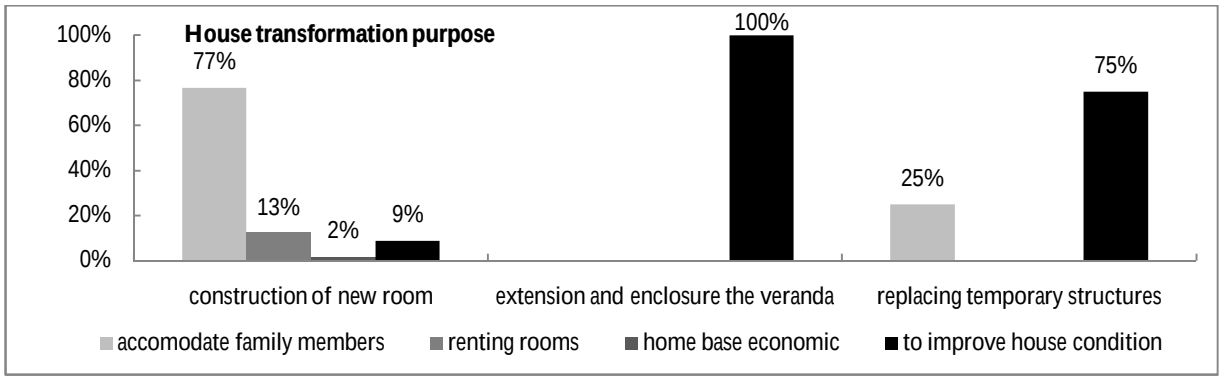


Figure 4-17 Respondent's house transformation purpose

Associated with the transformation process undertaken by the respondents, majority of the respondents (67%) did not conduct any consultation with other people such as local leader, neighbours or municipality in the process of changes to the house. As for those who did consultation in this transformation process were conducted with *fundi* (builder) and several others consulted with their families associated with the kind transformation to be performed. In this transformation process, there are 4 respondents who did consult with the Municipality which are all respondents who live in planned areas.

During the fieldwork, we found that neighbours have certain role in the transformation process. For example, we found one respondent at the time of survey were doing his house transformation by adding some room. In this process, the respondents were using their neighbour as a labour who did the construction of their new room. This personal contact of the respondents and his neighbour give mutualism transaction process whereby the respondent gets a relative low cost labour and the neighbour got a job. Still, no consultation exists in the process of the transformation.

4.3.4. Tenant housing process

Tenant respondents were asked about their home ownership plan, and majority of them have a plan to buy a land or house and only two respondents who have not decide to own their own house. Among the 18 respondents who have planned for their own house 8 respondents (44%) are still in saving preparation, 5 respondents (28%) have bought a plot but still not constructed yet and 4 respondents (22%) have built their own house but not finished yet.

The respondents were also asked to specify about their preferred area, most of them said they prefer to stay within Dar es Salaam (13 respondents). The reason of the respondents to choose a plot within Dar es Salaam is because of land price were cheap an. While for the respondents who choose outside Dar es Salaam are mostly respondents who have retired or did not have a fixed occupation and the want to move to their hometown or bought a large plot for an urban agriculture purpose.

Table 4-9 Respondent's tenant preferred area

Prefer area of having own house		Reason to chose the place				Total
		cheap	close to friends or relatives	close to workplace	other	
within Hanna Nassif	Count	0	1	0	0	1
	% within Prefer area	,0%	100,0%	,0%	,0%	100,0%
within Dar es Salaam	Count	5	1	3	4	13
	% within Prefer area	38,5%	7,7%	23,1%	30,8%	100,0%
outside Dar es Salaam	Count	1	1	1	1	4
	% within Prefer area	25,0%	25,0%	25,0%	25,0%	100,0%
Total	Count	6	3	4	5	18
	% within Prefer area	33,0%	17,0%	22,0%	28,0%	100,0%

4.3.5. Summary

There are three the general pattern of ownership access exist namely; land acquisition, house acquisition, and others (eg. inherited, squatting, or given by employers). Among the 75 owners, site selection or initial housing process of the respondents were mostly by purchasing a land (61%) and erected their house. The land acquisition process mostly exists in valley area and central area, while in planned area most of the respondents ere bought an existing house. In general, majority of the housing process were started with the land acquisition as the majority mode of the respondents for their initial housing process.

The majority of the respondents use an informal mean in their access to the property. Majority of them bought their land by using informal channel, meanwhile for the majority of the respondents who bought the house in planned area, most of them bought it in the formal channel through NHC. In general 80% of the process was conducted in the informal channel and all the respondents in central and valley area were use this informal channel. Meanwhile the respondents in planned area, 33% respondents were using a formal channel in their process - in this case bought an existing land through National Housing Corporation (NHC).

As we know that in the process of housing that occurred in the slum area in general begins with the pattern of incremental development. Residents generally build their houses in stages and gradually improve the house in accordance with the financial capacity and needs of their lives. In the study area in general it is reflected by the conditions in which most people build their house in an incremental way. The incremental building always follow even their initial houses were build in a good condition. Most of the main purpose of transformation is to accommodate the family members. In addition the process of

transformation was supported by the availability of vacant land since most of the respondents have a big plot in study area.

Among the tenant respondents, majority of them have prepared their house ownership processes by saving their money or even have bought a plot. Most of them preferred to stay within Dar es Salaam since the land price were cheap and close to workplace. Majority of the tenant respondents were having a plan to have their own house and for that reason most of them saving their money for the housing plan.

4.4. Potential actors and their involvement

The study observed that there are some actors involve in the decision making process of the respondents in their housing process activities. In the initial of housing process or during the property acquisition there were some actor were involved with the respondents. Landowners, local leaders, family/relatives, and friends/neighbours were the most frequently people involved in the process undertaken by the respondents. In general all the party were involved as a witness in the process of the housing or land acquisition. Among 94 respondents there were also 14 respondents who involve the municipality (government) in their housing process which mostly the respondents from planned area.

Table 4-10 Mean of access and people involving in housing process

People Involve	Means of access		Total
	formal	informal	
Family / Relative	1	30	31
Friends / neighbours	2	17	19
Landowner	10	42	52
Government	13	1	14
Local Leader	1	26	27
Broker / lawyer / squat	1	3	4
Total	**18**	**76**	**94**

The role of each people involving in the process was ranging from giving advice, witnessing the process, ensuring the plot boundary or giving a legality of the process. Base on the two kinds modes of access (formal and informal), mostly the process involve landowners, family/relative and local leaders in the informal mode. Meanwhile in the formal mode mostly the government (municipality) was the majority party involving in the process. The government involve in the process were majority from the respondents which made a house acquisition in formal means (7 respondents), the involvement of the government were in the legality process since the housing process was conducted by a public enterprise (NHC) which part of the government program of housing provision.

In the next step of housing process, when the respondents started their housing construction, the respondents were asked about the consultation they made during the construction of their houses. Of 73 respondents, most of them did not consult with someone else during the construction process and only 21 respondents (29%) said the have consulted in the construction process. Most of the respondents did not consult about their house construction since most of them build their house by themselves.

The neighbours/friends were mainly giving them some help in the witnesses of the process or sometime the neighbours help them in selling the plot (information disseminations). One of the respondents was asked about the neighbours role in the housing process and she said that *"Neighbours provided advice on construction by taking into account the land suitability. The area is flood, so neighbours advised us on how to construct and by the time there was no local leader involved in the process (Respondent #15)".* Neighbours also have a role in

exchanging ideas about how to construct the house such as house arrangement and alignment *(Respondent #53),* provide advices on construction practice *(Respondent #77)* or ensuring the security of their property and providing advice on construction (number of rooms) *(Respondent #84).*

The role of local leaders mainly in the land transaction process in which in the transaction process the neighbours helped in determining plot boundaries and confirming them to the local leaders, then Mtaa and Ten-cell leader confirm and supervise the exercise of boundary identification. The local leaders also provide necessary information and any support of his capacity and mainly giving advice on respecting plot boundaries to avoid unnecessary conflicts among residents during the housing construction or transformation. The interview also found that the respondents really feel good and helpful with the existence of local leader such as Mtaa and Ten-cell leaders in the neighbourhood since this local leader help them in facilitating the residential licences planning documents process or even preparing the identification document of plot for mortgage or opening bank account.

Family member or relatives also have certain role in the housing process of the household in their decision making process. The interactions of these actors in the housing process of household in the study area are varying based on the stage of the process happen. The results from survey which have conducted in the study area show that most of the respondents get their information about the study area from their family or relatives. Based on the character of the neighbourhood, there are similarities between the central region and the valley in the context of family involvement in their housing process. In contrast to the planned neighbourhood which did not find any involvement of family or relatives in the process of housing.

4.5. Interaction in Housing process activities

4.5.1. Site selection or initial housing process

Base on the finding of the respondents' source of information whereby majority of the respondents main source of information were their personal contacts such as family / relatives or friends / neighbours. In this case the majority of respondent use their social contacts to get the information about the houses or the vacant plot. Family/relatives and friends/neighbours were also the main actors which help the respondents in giving the information and helping them in determine to buy the plot/house. Base on the table below it was found that 75% of the respondents being helped by the people they know in determine their decision. In this case the respondents were asked about who help them in determine their decision whether to bought the plot/hour or not to buy it.

Table 4-11 People who help in the selection based on the locality

Neighbourhood Character		People who help in the selection			Total
		family / relatives	friends/ neighbours	others	
Planned	Count	5	13	7	25
	% within Neighbourhood	20%	52%	28%	100%
Central	Count	17	12	11	40
	% within Neighbourhood	43%	30%	28%	100%
Valley	Count	15	9	5	29
	% within Neighbourhood	52%	31%	17%	100%
Total	Count	37	34	23	94
	% total	39%	36%	25%	100%

Based on the neighbourhood characteristic there were different interactions among respondents according to the people which helping them in making a decision. In planned area mostly of the respondents being helped by their friends. Associated with the condition in planned area whereby from the information \ about the person they already know who live in the settlements, it was found that in planned area there were only few of the respondents have a personal contact in the neighbourhood. This condition was different with the other two neighbourhoods in which most of them were helping by their family/relatives, since most of their family have already stayed in this settlement.

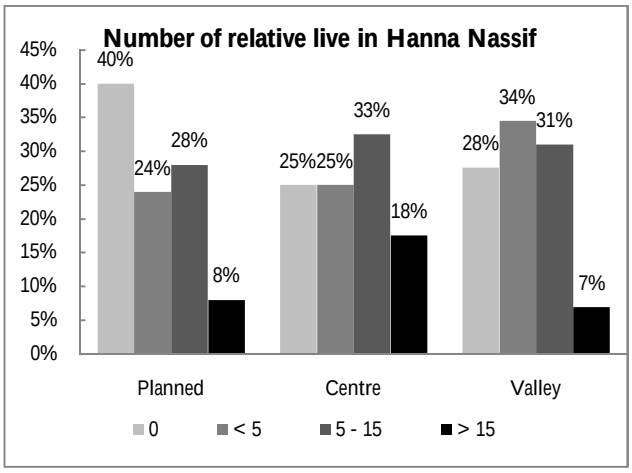


Figure 4-18 Number of relative live in Hanna Nassif

4.5.2. House construction

The interaction in the housing construction is mainly considering among the households with their neighbours. There were no significant interactions with the formal actors such local leaders or municipality in their housing construction. Majority of the respondents did not have any consultation about their housing construction (71%). The interactions which exist in the housing construction were reflected only between respondents and the *fundi* (house builder), in this case 10 respondents among 21 respondents who have made a consultation during their housing construction.

The interactions among neighbour were mostly in helping for material security or giving some advice and idea about the housing construction. Some respondents also said the neighbours help them in transporting the building material and giving them some information needed about the way constructed the house. One respondents said; *"When we started to build our house the neighbours at that time gives some advice about the way to build the house foundation and share some information where to get cheap building materials and mutual assisting for security of the neighbouring (Respondents #51)".*

Table 4-12 People to consult in housing construction

	Frequency	Percent	Valid Percent
relative	2	2,7	2,7
friends	1	1,3	1,4
local leader	4	5,3	5,5
Municipality	4	5,3	5,5
other	10	13,3	13,7
nobody	52	69,3	71,2
Total	73	97,3	100,0
System	2	2,7	
Total	75	100,0	

4.5.3. House transformation

In the housing transformation process, it seem that the interaction among respondents and other actors did not exist. This condition was the same with the construction stage whereby majority of them did not have any consultation during their transformation process. In the interview it was found that among the

respondents the consultations majority being done still with the *fundi* (builder) about the good way in the transformation process. Other respondents consulted with their family members due to the financial factors and about the good way in conducting the transformation. The respondents who have consultation with municipality (4 respondents) were the respondents who live in planned area.

Table 4-13 People to consult in housing transformation

	Frequency	Percent	Valid Percent
relatives	5	7	7
neighbour	1	1	1
friends	1	1	1
municipality	4	5	5
others	15	20	21
nobody	48	64	65
Total	74	99	100
System	1	1	
Total	75	100	

4.5.4. Summary

From the observation most landowners in study area obtain land by way of purchase from the real owners, both in planned or unplanned areas. The interaction among respondents with other actors was investigating by looking at the relation between the respondents and the owner/seller.

Based on the chart below, it shows that the pattern of activity in the housing process for each neighbourhood and their relation with the owner. The relation of the respondents and the owner as a seller has a different character base on their property means of access. Majority of the respondents who got their property through land acquisition were have a relation with the owner such as their family or relatives (people know) and directly bough from land owner (49%). The respondents who got the house from other way such as inherited are of course have a personal contact with the previous owner, and in this case their family or relatives. The tenant conditions show that most of them rent a house from directly from the owner which mostly they did not have any kind of relationship with the owner. While the different was found in the process of house acquisition in which the majority respondents (47%) bought the house from a public enterprise which regard to the National Housing Corporation (NHC).

Table 4-14 Relation with the previous owner/seller

Condition of ownership		Relation with the previous owner/seller				Total
		people know	landowner	NGO	others	
land acquisition	Count	20	22	2	1	45
	% within ownership	44%	49%	4%	2%	100%
house acquisition	Count	3	6	8	0	17
	% within ownership	18%	35%	47%	,0%	100%
others	Count	11	0	0	1	12
	% within ownership	92%	,0%	,0%	8%	100%
tenant	Count	8	11	0	1	20
	% within ownership	40%	55%	,0%	5%	100%
Total	Count	42	39	10	3	94
	% within ownership	45%	41%	11%	3%	100%

There are six actors were exist who involve in the respondents housing process namely; family/relatives, friends/neighbours, government, landowner, local leaders and others actor such as brokers or middle

man. From the survey reveal that the main actors which usually involve in the respondent's housing process are family/relatives (33%), friends/neighbours (20%), government (15%), landowner (55%), and local leaders (29%).

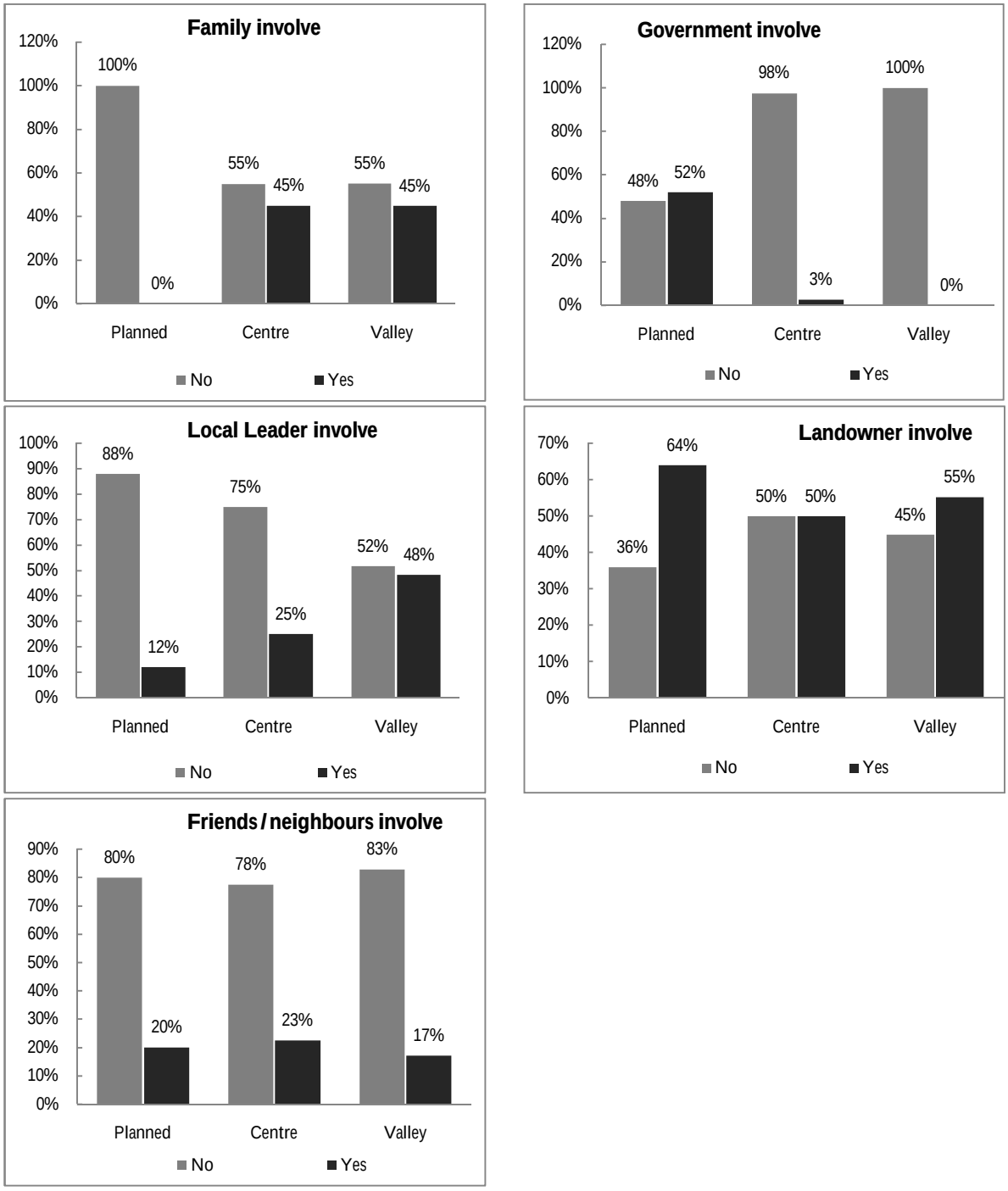


Figure 4-19 Kind of people involved in housing process based on locality

The compositions of each actor which involve in the housing process were different base on the different neighbourhood in the study area. Particularly for a planned area, it appears that the pattern of activities more involving landowner and a public enterprise in this regard to the National Housing Corporation (NHC). In the planned area also show that the absence of interaction with the people they already know such as family or friends. All the respondents in planned area did not involve their family in the process of acquisition with the owner meanwhile in the other two area most of the respondents involving their

family/relative during the housing process. Meanwhile the composition of government involve in the process was dominated in the planned area. More than half of the respondents (13 respondents) in planned area said they were involve the municipality during the process of housing acquisition since the NHC was a part of government program in housing provision.

Base on the relation with the owner, most of the respondents in valley and central area were know the owner or seller of the plot/house such as their family/relative or friends/neighbours. Base on the figure below indicate that the respondents relation with the owner were really different between planned area and other two areas. For planned area most of them did not have any relation with the previous owner. It was different with he other two areas with more than half of the respondents actually bought their property from people they already know, such as their relative, neighbours or friends.

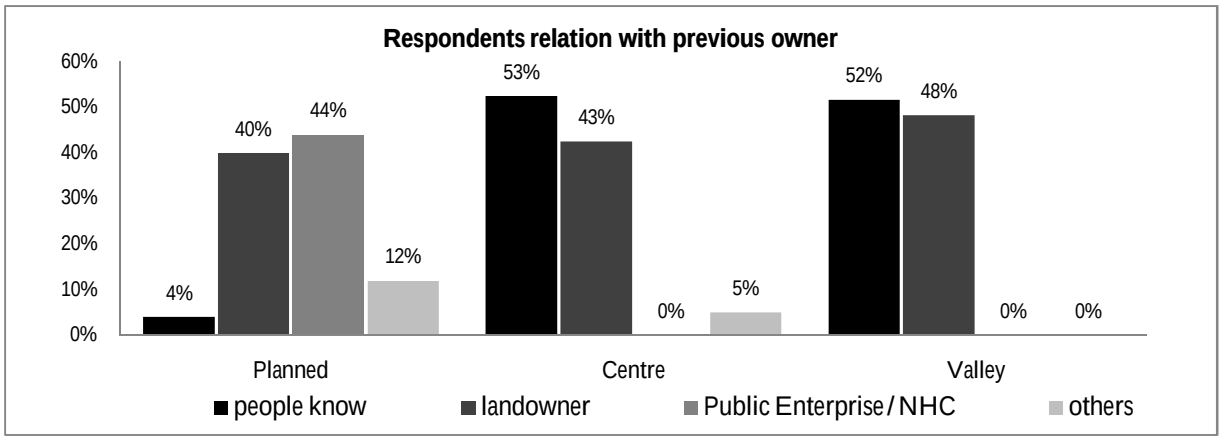


Figure 4-20 Respondent's relation with owner based on locality

5. DISCUSSION FOR UPDATED CONCEPTUAL MODEL

This chapter provides the conclusions of the study derived from research findings as regards to the interaction of actors played in housing process and the extent of the result can be useful in order to enhance the existing conceptual model. On the basis of the research findings; the interaction and housing activities are highlighted and a recommendations are made as a way forward.

5.1. Introduction

In this chapter, conceptual models will be developed from existing agent-based model (Gina's model) to combine the driving forces of informal settlements growth with the behaviour of agents. The main actor in the process was the household which is reflected by the attribute attached to it. In this context the interaction was seen as the interaction that occurs between the main actors with other actors involved in influencing decision-making process of the household in the housing process.

There was no interaction among agents in the decision making process once the agent enter the DMM to find a new house in the concept developed by Gina Young (2010). In Gina's model once the agents' state change and engage the decision to enter DMM, this agent directly perceives the environment from the set of available location options. Meanwhile, based on the finding in this study there was some interaction of agents in looking for the new house. The interaction was reflected by the condition in which the majority of respondents obtained information about the availability of land from various sources of information.

5.2. Gina's model

In Gina model there were consist of 2 modules, namely agent transformation module (ATM) and decision making module (DMM). ATM contains agent information and agent states which was determined whether the agent will be ready to enter DMM to find a new house. Attribute or variable in the ATM itself consist of employment, income, tenure status, and number of children. The condition of agent state in this module will determine the agent to enter the DMM whereby depend on the variable of the agent has reached a threshold that is determined by the increasing number of family members. Meanwhile the DMM was the steps of agent during the household agents seeking the plot for their new houses.

The agents in the Gina's model were the households which categorized by form of their employment and tenure status. In the model there were owner agents and tenant agents which have different behavioural base on the attribute of the variables they possess such as the threshold which made them to enter the DMM. Once the threshold reached the agent was triggered to enter the DMM. In looking for the plot the agent will interact with the environment from the set of available location options. The choice was made if the condition within the environment suitable with the agent such as utility value, within its budget constraint, and the character of neighbour (figure 2-6) then the agent purchased the plot and commenced construction. If the condition was not met than the agent went through the cycle again.

5.3. New model feature

Since in Gina's model the agent did not have any interaction with other agent and only interact with the environment by perceiving the environment which was represented by building polygons. These building

polygons have some attributes such as agent utility, lot price and neighbourhood character. In the new model feature, the interaction between agents will be developed to enhance the reality of the model. The propose interaction between agents will be developed since from the finding of this majority of the respondents actually got the information about the availability of plot from someone else. Based on the result in study area, it was found that most of the respondents got the information about the location from their family or friends (57%) and most of them were also helping by the same actor in making a decision. The result also found that 45% of respondents were bought the property from people they know such as family/relatives (29%), neighbours (4%), and friends and employer (12%). These existing interactions of the respondents indicate the respondents have certain behaviour using their contact in finding a house.

There was two types of agents were depicted in the ATM of Gina's Model, which described as owner agents and tenant agents. These two agents had different behaviour in seeking for the new house once the threshold reached based on the number of children they have. In a new model feature, there will be a new agent is added who will interact with the agent who looking for a new house. In order to put the interaction among agent in the existing conceptual model (Gina's Model), household agents will be distinguished in *"seeker agents"* and *"source agents"*. Generally, the households were considered as source agents or network of other agents in the house finding process. These household then will change their status from source agents into seeker agents when a threshold is reached and they are starting to find a new house. The interaction will exist between these households who looking for the new plot with the other households.

In order to distinguished these two agents network condition which determine their interaction condition, there will be and additional attribute in the agent state. The length of stay of the households will be added in the ATM as the agent state which determine whether the agent who seek for the new house have a good network or not. The behavioural of agent will be different based on their condition of length of stay in using their network in looking for the new plot. If the agents have stay in the area for a long time then they will have a good network and vice versa.

As describe in table below indicates the respondents' duration of stay affected the respondents' social network condition which depicted by the number of neighbours they know personally. From the table, it reveals that 15% of the respondents were seen as the household who had limited network since they were considered as the new comers who need times to build their networks. Meanwhile majority of the respondents who have stay long enough in the area - in this case more than 10 years - were considered having a good network. The households' size of network and their position in network were considered also based on their length of stay, since majority of the respondents who have stayed for a long time (more than 10 years) knew their neighbours more.

Table 5-1 Number of neighbour they know personally

Duration in Hanna Nassif		How many neighbour they know personally				Total
		< 5	5 - 10	11 - 15	>15	
< 5 years	Count	8	4	0	2	14
	% within Duration in Hanna Nassif	57%	29%	0%	14%	100%
5 - 25 years	Count	6	5	3	20	34
	% within Duration in Hanna Nassif	18%	15%	9%	59%	100%
26 - 45 years	Count	0	6	5	28	39
	% within Duration in Hanna Nassif	0%	15%	13%	72%	100%
> 45 years	Count	0	2	0	5	7
	% within Duration in Hanna Nassif	0%	29%	0%	71%	100%
Total	Count	14	17	8	55	94
	% within Duration in Hanna Nassif	15%	18%	9%	59%	100%

Based on the finding of this study, there are 2 types of respondents' networks in seeking their houses/plots whereby the type of network as can distinguished as:

1. Horizontal network; a network in which the actors and their source did not involve a formal organisation whereby the network usually their relatives, neighbours, or friends;
2. Vertical network; a network in which the actors and their source is come from a formal organization such as government, public enterprise or newspaper (Smith, 2003).

The horizontal network or was become the major contact among the respondents since the majority of the respondents (57%) used it as the source of information to get their new place. The agents who search for a new house will have different rule to follow if the type of network is different. If the agents use their personal contacts or horizontal network – in this case their family, relative or friends – then the likelihood of purchase and commence build the house without perceiving environment is become bigger, because the personal networks will lowers the risk of opportunistic behaviour and the information were more detailed which suit for seeker agent Furthermore, from the finding as described in the previous chapter majority of the respondents were got the information from their horizontal network and bought the plot from the same actors. It was reflected in the result whereby 45% of the respondents have a personal relation with the previous owner such buying the plot from their family or rent a house from their relative. Meanwhile, the existing of vertical contacts also found in the study area, such as from housing public enterprise (NHC) or middle-men (broker) as the respondent's networks (18%) and other 25% of respondents did not have any network since they were looking for the house by themselves.

5.4. Updating conceptual model

The behavioural agent will affected by their network use in finding a house. The rule for the updating model will be reflected the interaction being made among the agent and base on their length of stay. The longer the household have lived in the area the better network they will have. If in the Gina's model the behavioural of agents in looking for a new house in only by perceiving their environment, then in updating model the new behavioural of agent will be adding in the model which depend on the seeker agent network condition. As Mika (2005) said the network will make the actors have better access to valuable information, resources, social support, etc., if an actor occupy a favoured position or having personal connections in the network. The favoured position in this case will be considered as the length of the household stay in the area.

Assumptions for the updating agent behaviour based on their interaction are listed below:

1. The seeker agents who stay for a long time in the area will use their network as an information source in finding the plot which considered they have more network in the area as a source agent;
2. The seeker agents who just come or stay not for along time in the area will not use the network and perceived the environment since they have limited social network;
3. The combination of using network and perceived environment which based on the condition if the seeker agent find the suit plot or not.

In general the seeker agent will use their source agent as a social network will depend on the length of stay. If the agent use their network and the condition meet then they will purchased the plot. Meanwhile when the information from the network is not giving them valid information or no information at all, then they will perceived the environment and make sure the condition is meet with them. For the seeker agents who are the new comers in the area, they will seek the plot by themselves by perceiving the environment before decided to buy the plot. If the condition is not meet then they will again search for the new plot through the cycle again.

Type of networks will also give some influence for the agents in seeking the plot. The characteristic of agent based on their length of stay and network types will affect the condition of the cycling process. The assumption of this condition because of the horizontal network or informal channels of social network were giving better information for the seekers. In other words the horizontal networks are giving more reliable information in their informal social ties (DiMaggio & Louch, 1998).

The new input of the use of network in the model can be described in the picture below.

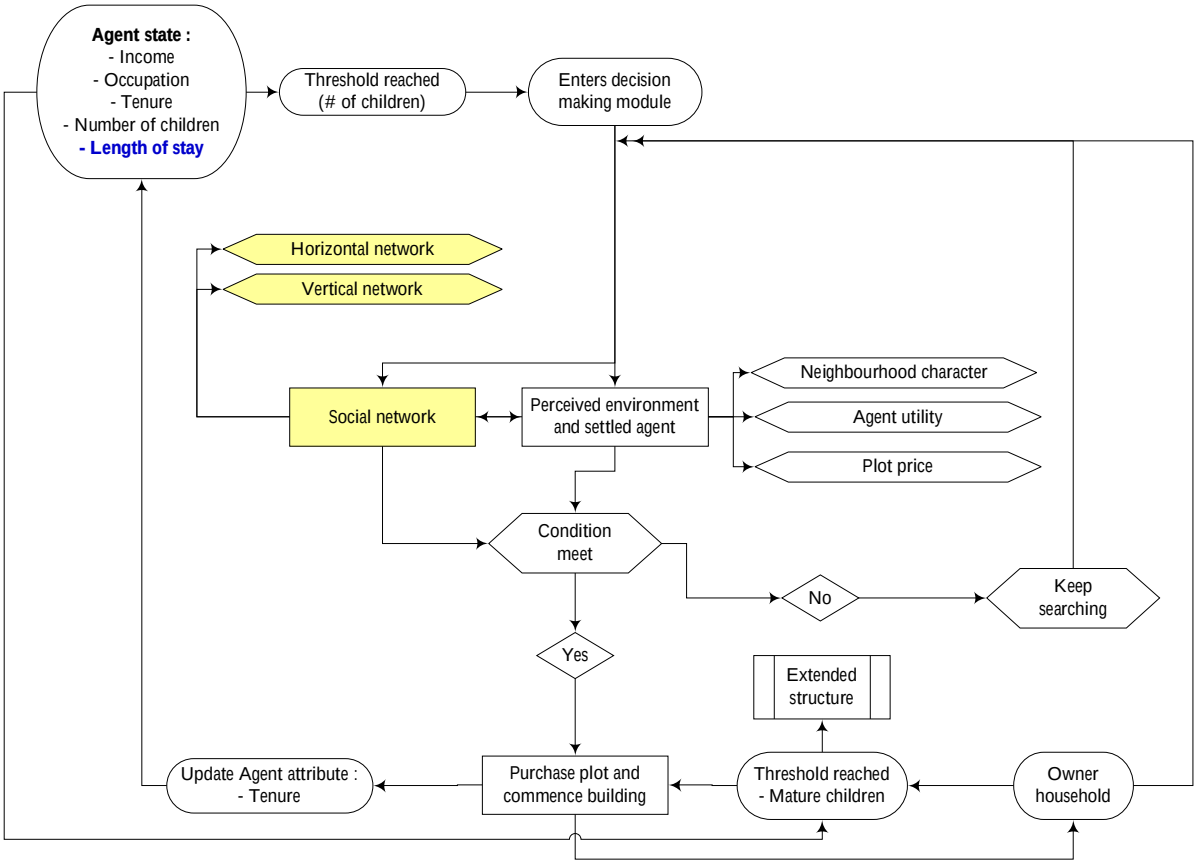


Figure 5-1 General new feature model

5.5. Discussion

Based on the finding there were some interaction among household in the process their house finding. The conditions of existing interaction were reflected from the respondents' source of information about the plot as described in the previous chapter. The interaction were not only depicted by the respondents' information source but also by the process of acquisition whereby the respondents bough the plot from the people they already knew. These results of existing interaction of the respondents indicate the respondents have certain behaviour using their contact in finding a house. Due to the condition, the new updated conceptual model is proposed in order to make the existing model more depicted the reality.

The agents who seek for the new plot will use their network based on how long they have stayed in the area. The assumption in this model is; the good network will give good information about the availability of the plot which will suit for the seeker agents. The type of network will also give different behaviour of

agent whether they will only rely on the network or using both the information from the network and also visit the plot in perceiving the information about the plot. Based on the literature, the use of personal contact, in this case horizontal network, will give more satisfaction of the agent who looking for a new home (Röper, et al., 2009).

As described in the previous chapter, the use of network especially the social network such as the personal contact is the majority of the respondents' way of interaction in finding a new home. Not only in giving information about the plot availability, this personal contact also have significant role in the respondents' decision to choose the selected site. From the result it was found that during the decision making the respondents need some help in their decision making process. When the respondents were asking about people who were helping them in making their decision, most of them said the family/relatives have the main factor in their decision making. It was reflected from the result which 75% of the respondents being helped by the people they know in determine their decision whether to buy the plot/house or not. It is indicated that using network is the agents' behaviour in seeking the new house.

5.6. The propose for validation

The proposed of the new feature in the existing conceptual model with the addition of interaction among agents is not developed or validated yet both in computer program and by inputting certain parameter based on the experts' overview. In order to developed or validated this new input or new feature in the model, it is needed some feedback and idea from experts which not conducted yet to test the robustness. The main issues about the robustness is concerning with the level of significance effect from the new feature in the model. Even though based on the survey showed that interactions among household were emerge since the initial house searching process, but still not incorporate yet how the network among household has an effect on the number of contacts.

6. CONCLUSION AND RECOMMENDATIONS

This chapter gives the conclusion of this research. It also highlights the limitations of this research, gives recommendations, and proposes further research.

6.1. Conclusion

To identify and describe the social interaction in informal settlement during housing process;
Social ties and social network is the main source of informal settlers in order to seek their property. The main interaction was found in the initial housing process when the respondents seek for the new house. Kinship or personal contact was the main source of information among the respondents. The personal contact or network in the destination is also another factor which since majority of the respondents was depending on the informal means and the parties involving in the process were their personal contacts such as family, relatives, friends, neighbours or local leader. Kinship and neighbours have played an active role in the settlement activities and interaction process such as having advices and information about the building construction. Research shows that kinship and family factor were dominate the respondents in their preference housing-choice patterns.

The interaction seems more informative than normative, since the main purpose of the interaction was conducted in informal way and did not expect any kind of formalization of their property. Kinship and neighbours have played an active role in the settlement activities and interaction process such as having advices and information about the building construction. Neighbour or relatives sometimes give the utility services such as tap water or taking care of the unfinished building. Research shows that kinship and family factor were dominate the respondents in their preference housing-choice patterns. As an informal settlement in general the study area has a condition where the neighbourhood relationship is pretty tight.

To provide empirical evidence on the role of social interaction as agent behaviour in housing process;
Base on the study, it was found that a vast majority of people know their neighbours. These neighbours have varies role in the respondents activities from occasional help and advice in their housing process. The interaction pattern of most of respondents is more informative rather than normative. This is reflected in the respondents activities of their housing process did not follow any kind of rule or regulation. Since the initial process of land or house acquisition, majority of the respondents were depending on the informal means and the parties involving in the process were only personal contacts such as family, relatives, friends, neighbours or local leader.

The interaction with neighbour was important in dealing with the next step of house finding, since the information and social ties among them in informal settlements is very good. Among the respondents majority know more than 15 neighbours personally. But the respondents' length of stay - as described in previous chapter - affected the number of the respondents' number of contacts. The new comers will need times to build their social networks especially in house searching and in developing their house.

The personal contacts also have significant role in the respondents' decision to choose the selected site. During the decision making and the way the respondents finally decide to buy/rent the selected

house/plot, in this final process the respondents were need some help in their decision making process. When the respondents were asking about people who were helping them in making their decision, most of them said the family/relatives have the main factor in their decision making.

During the housing process from the observation and interviews indicate that the majority of respondents were generally did not follow the rules or regulations set by the government. Their understanding was limited to the local norms or agreements with neighbours as well as consultation with local leaders to avoid any conflicts that may occur. Majority of respondents were not even aware of the existence of a master plan and only concern with the neighbours' or local leaders' advices.

To develop and combine the data gathered into the existing conceptual model of ISG.
The informal network is majority source of the respondents in order to get the information about the land availability. This condition is common in the informal settlements because as Roper et al., (2009) said the cost for the information search through informal channels is lowers than formal channels. From the empirical finding, it was found that most of the interactions were generally associated with the personal network such as family or relatives. Social interaction is important in groups because people take on different roles in a group than they do as individual.

From the finding of the study, the household were considered as an individual in the network with have different status based on their state. The assumption of the proposed new feature is all the households considered as a network for each of them and the will change the status become seeker when they reach a threshold to seek a new plot. Finding a house via social network will increase if the seekers have known someone in the neighbourhood of destination, so the size and position of agent in their social network are depending on the length of the household live in certain area.

6.2. Limitation of study

In line with the findings of this research about the interaction and the use of network as a new feature for the existing conceptual model, some limitation of this study still exist concern with:

- It was difficult to validate the proposed new model since it was not run in simulation or computer program yet in order to know how robust it is and the effect of the new input to improve the existing model:
- There was a limitation of fieldwork time that affected in the collection of enough data;
- Language barrier was a key factor that affected this research since the researcher could not speak Swahili and relied on research assistants;
- The limitation of English language is a major setback for writing this research since it is a foreign language.

6.3. Recommendations for future work

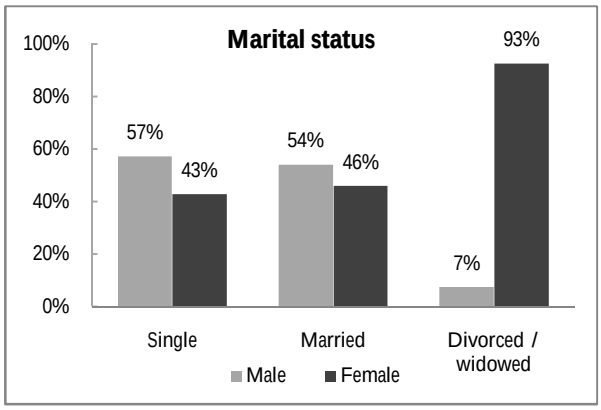
Future research would be interesting to consider some factors such as:

- The future research should look into how to validate and to run this model to test its robustness
- The future research should see to expand on the social network existing in the informal settlement in order to include all the actors of informal settlement house acquisition process.

ANNEX

Annex 1 Respondent marital status

Marital status	Frequency	Percent
Single	7	8
Married	61	64
Divorced/widowed	27	28
Total	95	100



Annex 2 Respondents sex and age distribution

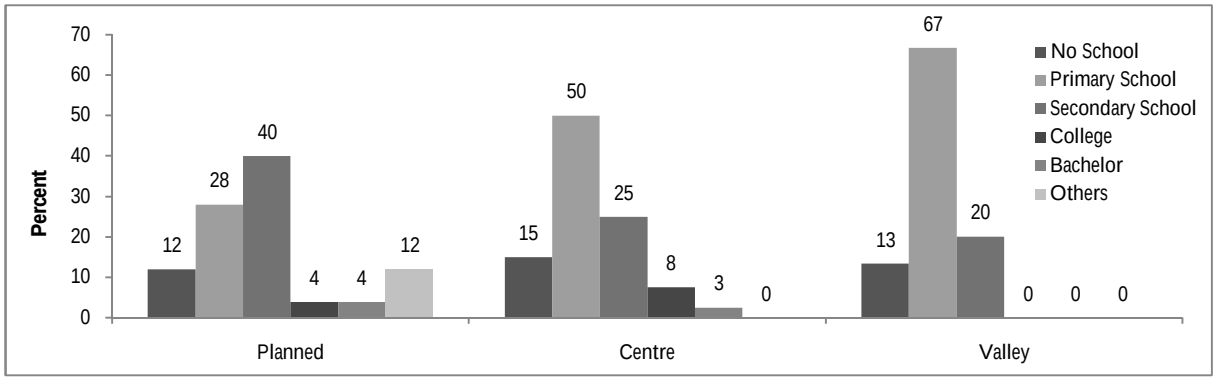
	Respondent sex	Respondent age				Total
		< 25 years	25 - 45 years	46 - 65 years	> 65 years	
Male	Count	0	14	12	13	39
	% within Respondent sex	,0%	35,9%	30,8%	33,3%	100,0%
Female	Count	2	19	22	13	56
	% within Respondent sex	3,6%	33,9%	39,3%	23,2%	100,0%
Total	Count	2	33	34	26	95
	% within Respondent sex	2,1%	34,7%	35,8%	27,4%	100,0%

Annex 3 Respondent occupation

Neighborhood character		Respondent occupation					Total
		Government	Private	Self-employment	Un-employment	Housewife	
Planned	Count	0	2	14	7	2	25
	% within Neighborhood	0%	8%	56%	28%	8%	100%
Central	Count	3	4	21	5	7	40
	% within Neighborhood	8%	10%	53%	13%	18%	100%
Valley	Count	3	2	19	4	2	30
	% within Neighborhood	10%	7%	63%	13%	7%	100%
Total	Count	6	8	54	16	11	95
	% Total	6%	8%	57%	17%	12%	100%

Annex 4 Respondent's occupation based on locality

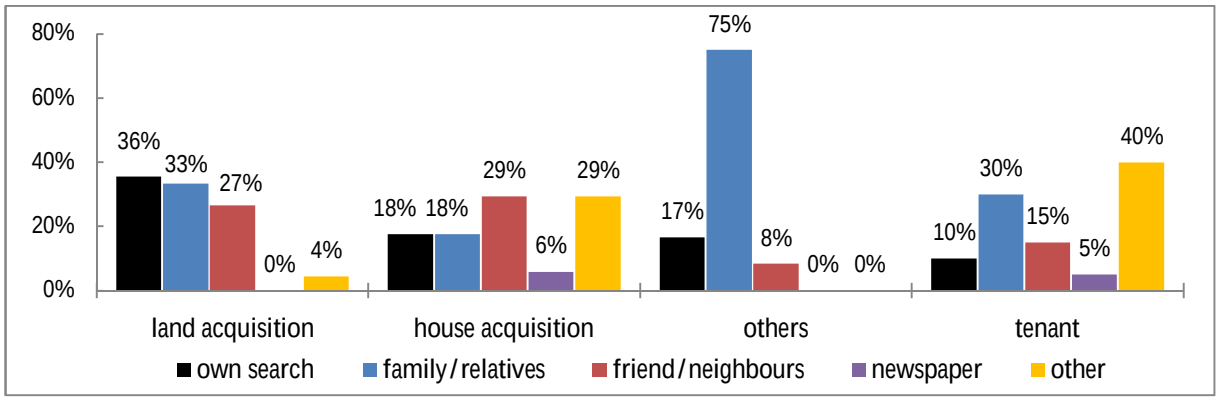
Annex 5 Respondent's education level based on locality



Annex 6Respondent's reason to choose Hanna Nassif

No	Reason	Frequency	Percent	Valid Percent
1	cheap	18	19	19
2	family / relatives	29	30	31
3	friends	1	1	1
4	good area	22	23	23
5	near to workplace	12	13	13
6	others	12	13	13
Total		94	99	100
Missing System		1	1	
Total		95	100	

Annex 7 Respondent's source of information and housing process



Annex 8 People already know in Hanna Nassif

	Frequency	Percent	Valid Percent
yes	70	74	74
no	24	25	26
Total	94	99	100
Missing system	1	1	
Total	95	100	

Annex 9 Initial housing process in Hanna Nassif * Year of First Reside Crosstabulation

Initial housing process		Year of First Reside						Total
		1950	1960	1970	1980	1990	2000	
land acquisition	Count	1	11	15	8	6	5	46
	% within Initial housing	2,2%	23,9%	32,6%	17,4%	13,0%	10,9%	100,0%
house acquisition	Count	0	2	3	4	4	4	17
	% within Initial housing	,0%	11,8%	17,6%	23,5%	23,5%	23,5%	100,0%
others	Count	1	3	4	1	1	2	12
	% within Initial housing	8,3%	25,0%	33,3%	8,3%	8,3%	16,7%	100,0%
rent	Count	0	0	0	2	4	14	20
	% within Initial housing	,0%	,0%	,0%	10,0%	20,0%	70,0%	100,0%
Total	Count	2	16	22	15	15	25	95
	% Total	2,1%	16,8%	23,2%	15,8%	15,8%	26,3%	100,0%

Annex 10 Initial housing process in Hanna Nassif

Neighbourhood character		Initial housing process in Hanna Nassif			Total
		land acquisition	house acquisition	others	
Planned	Count	8	10	3	21
	% within Neighbourhood character	38%	48%	14%	100%
Central	Count	19	6	8	33
	% within Neighbourhood character	58%	18%	24%	100%
Valley	Count	19	1	1	21
	% within Neighbourhood character	90%	5%	5%	100%
Total	Count	46	17	12	75
	% of Total	61%	23%	16%	100%

Annex 11 Houses Condition

Walls material of original houses

Material	Frequency	Percent	Valid Percent
Brick	1	1	1
Mud and pole	30	32	32
Cement block	62	65	6,7
Total	93	98	100,0
Missing system	2	2	
Total	95	100,0	

Walls material of current houses

	Frequency	Percent	Valid Percent
Mud and pole	7	7,4	7,5
Cement block	86	90,5	92,5
Total	93	97,9	100,0
Missing system	2	2,1	
Total	95	100,0	

Material of the walls current house and initial house

Material of the walls in current house	Material of the walls in original house		Total
	Mud and pole	Cement block	
Mud and pole	4	0	4
Cement block	23	47	70
Total	27	47	74

Roof material original houses

Material	Frequency	Percent	Valid Percent
iron sheet	80	84,2	87,0
thatch	12	12,6	13,0
Total	92	96,8	100,0
Missing system	3	3,2	
Total	95	100,0	

Roof material current houses

Material	Frequency	Percent	Valid Percent
iron sheet	92	96,8	100,0
Missing system	3	3,2	
Total	95	100,0	

Floor material original houses

Material	Frequency	Percent	Valid Percent
tile	1	1,1	1,1
cement	69	72,6	75,0
clay/earthen floor	22	23,2	23,9
Total	92	96,8	100,0
Missing system	3	3,2	
Total	95	100,0	

Floor material current houses

Material	Frequency	Percent	Valid Percent
tile	8	8,4	8,7
cement	80	84,2	87,0
clay/earthen floor	4	4,2	4,3
Total	92	96,8	100,0
Missing system	3	3,2	
Total	95	100,0	

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