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Density and Transformation on Small Plot Residential Neighborhood;

The case of Mekelakya Sefer, Addis Ababa

Thesis submitted to the Graduate Programs Director of the Ethiopian Institute of Architecture, Building Construction and City Development (EiABC), Addis Ababa University, in partial fulfillment of the requirements for the Masters of Science Degree in Housing and Sustainable Development

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Academic Adviser – ELIAS YITBAREK (PhD)

June - 2019

Declaration

I, the undersigned, declare that this thesis titled **"Density and transformation on small plot residential neighborhood; the case of Mekelakya Sefer"** is my own original work and with the guidance of my adviser. It has not been presented for a degree in any other university, and that all sources of material used for the thesis have been duly acknowledged, following the scientific guidelines of the Institute.

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Certification:

Here with, I state that ELHAM MOHAMMED AHMEDTAHA has carried out this research work on the topic entitled **"DENSITY AND TRANSFORMATION ON SMALL PLOT RESIDENTIAL NEIGHBORHOOD; THE CASE OF MEKELAKYA SEFER"** under my supervision and it is sufficient for submission for defense.

Dr. Elias Yitbarek Alemayehu

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Date: _____

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Acknowledgement

My foremost gratitude goes to the Almighty Allah who willed that I accomplish this work and gave me all that I needed to complete this work of mine.

I would also like to thank my adviser for his dutiful and prompt guidance all throughout the thesis process.

The support and encouragement of my entire family was indispensable to me. I would like to thank all of them but a special thanks goes to my husband, Mohammedneja Shikur, whose role was not limited to encouragement and support but also gave me practical ideas and guidance to execute my thesis.

I would also like to deeply acknowledge my key informants who invited me into their homes and shared with me their stories and housing documents without hesitation.

Abstract

The research is conducted to understand the residential density, housing transformation and the relation between the two in a small plot residential neighborhood commonly known as 'Mekelakya Sefer'. The neighborhood is made up of plots ranging from 63.5m^2 – 78.8 m^2. The site has been chosen because of its small size and the extensive transformation it has undergone.

The research is explanatory in its nature and has both qualitative and quantitative analysis. Interviews, maps, random survey sample and purposive case study samples were used to gather data. The research mainly employs timeline comparative study between the original and current state of the neighborhood for analysis and interpretation.

The study found that Housing unit density was decreased and conversely household density has increased in the site due to housing transformation. The housing unit density owes its decrease due to the extensive joining of small plots to make larger ones. And the increase of household density is mainly through the wide spread practice of house/room rent within a housing unit.

Regarding housing transformation, there are two types of transformation; Extension type and Tabula rasa type. From the different motives of housing transformations, transformation due to Socio-economic reasons are the prevalent motive of transforming. Houses transform not to increase or decrease the density but to have more space for their socio economic activities. From these activities 2 (two) activities stand out as the factor to determine residential density change. These are Joining of plots and house/room rent. Joining of plots decreases housing unit density and house/room rent increases household density.

The study recommends the encouragement of regulated transformation activity as they provide affordable housing to tenants. At the same time, transformation increases and residential and commercial 'mixity'[1] of the neighborhood which is one of the goals of compact city. The study also recommends that allotted plots should not be too small as to push owners to merge them as one plot.

Keywords; - Residential density, Housing transformation, small plots

[1] Mixity implies the availability of varied neighborhood level services and amenities.

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Abbreviation

AACA – Addis Ababa City Administration

MDG – Millennium Development goals

SDG - Sustainable Development goals

BAR – Built-up Area ratio

FAR – Floor Area Ratio

CIS – Corrugated Iron Sheet

Local Terms

Edir - A form of social organization within neighborhood intended to create social co-operation

Debal – A state of having more than one household under the same roof (1 household per available room in a house)

Makatet – The legal process of enlargement of plot size by incorporating unclaimed land

Mirete – the process by which the government assigns land/housing to beneficiary

Shalka – a type of rank for personnel of armed forces

Yelemat teneshewoch – Dwellers who are evacuated from their house to make way for bigger development

N.B. - Both first and Sur names are written for Ethiopian scholars cited in this research.

-Names of Interviewees have intentionally been changed for anonymity reason.

All dates are in Gregorian calendar.

1. CHAPTER ONE - INTRODUCTION

1.1. Background

From the 1999, the Ethiopian Government has provided several plots of small sized land for residential purposes in the form of sale, gift *"Mirete"*, replacement or cooperatives upon registration of homeowners. These plots come in definite modular sizes of 65, 75, 90, 105, 120 & 150 m^2 and they are meant for single family residence. The plots were either given as empty plots for plot owners to construct or constructed by the government. The Land lease proclamation no 80/1993 stipulates that every citizen is entitled to land on lease. Thus, on the one hand, these small plots are cheaper for homeowners as they are less costly to acquire than bigger plots. On the other hand, they are assumed to create for a denser settlement as more households can be accommodated within a given neighborhood.

These sites are mostly found in the suburbs of Addis Ababa and they are relatively a short history compared to other forms of housing in the city like Kebele Houses, Public rental Houses or private medium and large sized villa houses that are found in the core and inner-city part of Addis. Many cases of such sites are found throughout Addis Ababa ranging from a few years old to a decade old.

The Mekelakya Sefer was not an isolated project in fact it was a prototype development repeated in Woreda 14 in Kolfe Keranio as well as in Bole, Gulele and Akaki Kality Sub-cities. The prototypes were constructed by the Addis Ababa Housing Agency in collaboration with MUDC (Ministry of Urban development and Construction) somewhere between1999-2001. The offices of the Agency was then based in the Addis Ababa Municipality in Piassa. In some instances, NGOs like RED BARNA and concern Ethiopia was involved in the construction of these houses. The main aim was to house development related evictees *'yelemat teneshewoch'* and to resettle people who have lost their houses due to fire and other natural disasters.

The Mekelakya Sefer is the subject of study of this paper. It is located in the Kolfe Keranio sub-city, Woreda 07 in what is commonly referred to as Betel Area. The site was built as a replacement site for people to be relocated to make way for the Sheraton Addis hotel.

This neighborhood has an aggregate of 63.5 m^2, 73.5 m^2 & 78.8m^2 plots of land with a central open area. Initially when the government gave these plots, it has constructed a 1 or 2 room house for each of the plots. Since then, the residents have altered, increased, modified or even demolished & reconstructed this houses to suit their needs.

1.2. Statement of the problem

Compact city design has been advocated as the future of sustainable cities in that it is believed to nurture better social equity, lower cost of infrastructure, efficiency access and transportation, higher density and better quality of life. 'In many countries, policymakers have used urban densification strategies in an effort to create more sustainable cities(Boyko and Cooper, 2013). Accordingly, density in its varied form is one of the component of compact city as it can be a means of controlling urban sprawl and enhancing sustainability. Ethiopia is one such country that has signed the Sustainable development goals and is taking steps towards sustainable development. In 2017, new structural plan of Addis Ababa was introduced with the aim of guiding the cities future sustainable development.

In the housing sector, the structural plan has introduced new ways of development where it encourages mixed development, Inner city renewal & upgrading and Densification.

But little is known whether those strategies have borne fruit towards achieving the bigger goal of Sustainability. This research will investigate if the anticipated density has been achieved in the case area of Mekelakya Sefer and whether or not the physical transformations on the area have contributed to densification of the site.

1.3. Research Objectives

The **Main Objective** is to find out the housing transformation of this neighborhood and the impact that the housing transformation had on the residential density

Specific objectives

- Finding out the residential density of these neighborhoods.
- Identifying reasons and methods behind the transformation

- identifying the change in built environment brought about by density
- Checking conformity of neighborhood with governmental density requirements

1.4. Research question

A. What is the residential density of small plot size single family residential neighborhood, Mekelakya Sefer?
    a. What is the housing unit density?
    b. What is the household density?
B. What are the physical transformation the neighborhood has undergone since its initial construction?
C. What is the impact of the physical transformation on the residential density?

1.5. Significance of the research

A key component of the compact city model is hosting higher urban density. With the already established theoretical and empirical link between compact city and sustainability, one can see the role of residential density in the larger issue of sustainability. As it is generally assumed that higher density developments are more sustainable (Sivam and Karuppannan, 2014).

On another tier, the residential density may be a factor of other variables. One such variable is housing transformation. According to Tipple and Salim (1999), housing by nature is not static and is bound for transformation.

If transformations are inevitable and potentially advantageous to users, it may attract other dwellers as well. Such transformation in a large enough scale can trigger changes in residential density worth considering when planning future housing. Thus this research becomes significant in

- Understanding the nature of user-initiating transformation on small plot housing
- Identifying the relation between transformation and household density
- Understanding the extent at which small plot can host transformation

Moreover, the type of neighborhood understudy is not an isolated project, it was a prototype development repeated in 4 other sub-cities in Addis Ababa. Yet there is a lack of documented work about it. This paper will play a role in narrowing the gap of knowledge about small plot housing neighborhood. And since this project was a government initiative, this paper will also study whether the specific project has achieved the government's own standards of residential density.

The relevancy of this study is related with the government current policy of densification of residential neighborhood. This study will show the role transformation can play in Densification. In so doing, this research hopes to secure the role of housing transformation either as an agent or drawback of densification.

1.6. Scope and limitation of the research

The paper has a thematic and geographical scope. The thematic scope is that of residential density in relation with physical transformation of the "Mekelakya Sefer" housing in Woreda 7, Kolfe Keranio sub city, Addis Ababa, Ethiopia which is the geographical scope of study. Also plots that have currently changed 100% of the land use from residential use to other types of land use will not be included in the study even if they are within the geographical range of the "Mekelakya Sefer" unless and otherwise that land use is included in the operational definition of density in the literature review section.

The following limitations are faced in this research. They are namely;-

- Lack of documentation on the acquisition, delivery and overall process of formation of the Mekelakya Sefer.
- Current Administration of Woreda 7 and the Kolfe Sub city have little knowledge about the site except starting from 2017 when they started housing cadaster registration of the area.
- Suspicion and hesitation on the part of some interviewees leading them to give skewed or biased information that can be misleading during analysis.

2. CHAPTER TWO - LITERATURE REVIEW

INTRODUCTION

The main objective of this thesis work is to study residential density and the impact of user-initiated transformation on density. But before one can begin to analyze the density, we will need to set up a theoretical framework of the following points

I. the Broader concept of compact city and sustainability
II. The concept of density and its importance in planning
III. the nature of household transformations

Hence, this literature has two major part; the first dealing with Residential Density and related topics. The aim is to build a platform of density from the broader sense of sustainability down to the specific scale of residential density and at the same time define concepts of density in a scientific fashion.
The second part will be dealing with User-initiated transformation of residential buildings. This section will describe the nature and impacts of transformation along with its causal and motivational factors.

2.1. DENSITY AND HOUSING

Introduction

Concept of the urban density is very old it has been applied ever since the Garden City movement in England and the early modernists movement in Germany(Sivam and Karuppannan, 2014). If simply put it is the number of 'units' per given area of land. It is perhaps the most useful tool for estimating the capacity or development potential of a site (Maccreanor et al, 2012). Although density is such a common concept for planners, researchers, policy makers, Forsyth (2003) says there is no agreed upon standard definition of density but rather each profession and region has come up with its own view of what density is and is not. In fact, Churchman (2009) cites it is suggested that every document should include a set of definitions for the density in question.

It will be appropriate to ask then, what is the issue of difference that makes density so differently understood by different fields. And what are some of the useful tools towards understanding the concept of density.

At the very least, density comprises two components says Rapoport (1975); these are the number of people present in an area and the space available per person.

This literature will review two main areas of confusion in understanding the concept of density. The first one is concerned with its mode of calculation and the second its relation with other subjective terminologies. Regarding the former, a key area of difference is the base land area calculation and regarding the latter, is the issue of perceived density and crowding (Forsyth, 2003).

This literature will revolve around Residential density, its causal and co- related concepts of urban sprawl, compact city and sustainability and set the framework and operational definition that will be used throughout the research.

2.1.1. The holistic concept of density

> *Density is a term that represents the relationship between a given physical area and the number of people who inhabit or use that area. It is expressed as a ratio of population size or number of dwelling units (the numerator) to area units (the denominator).(Churchman, 2009)*

According to Churchman (2009), density at first glance looks like a very appealing and simplistic concept in that it is perceived as a quantitative, objective and neutral term. 'Quantitative' in the fact that it can be expressed numerically, 'objective' as it is measurable and 'Neutral' in the sense that one cannot say a given density is positive or negative outright. But many other researchers including himself, Rapoport (1975), Boyko and Cooper (2011), Forsyth (2003) state that density is best described using both quantitative and qualitative means. Boyko and Cooper (2011) says in order for density polices to be truly effective three issues need to be considered: flexibility, versatility and an understanding of the 'hard' and 'soft' elements of density.

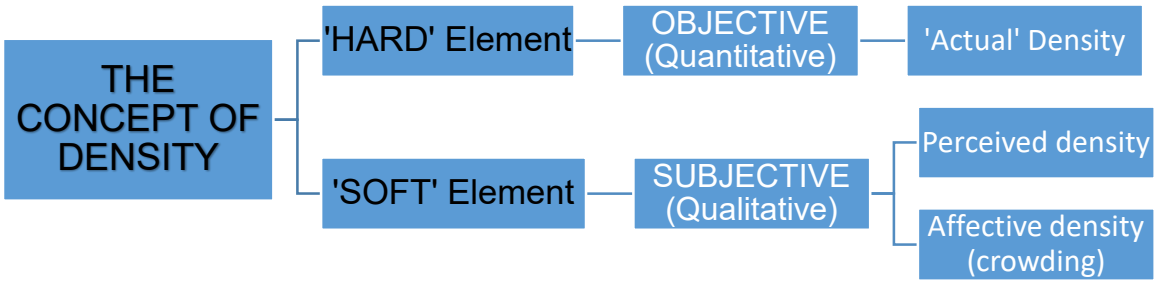


Figure 1, Holistic concept of density (Own Construction) Based on Rapopot 1975, Churchman 1999, Foryth 2003, and Boyko& Cooper 2011

By this we can understand that density is an important concept within the design of the urban environment, and represent more than a ratio of units to a given area (i.e., the 'hard' element). Rather, density also pertains to 'softer' elements that emphasize the human dimensions of density—perception, behavior and needs—as well as the quality and context of immediate and surrounding environments (Rapoport, 1975) (Boyko and Cooper, 2011).*Figure 3 on page 11* diagrammatically shows the holistic concept of density as proposed by the mentioned scholars. Now we will see in-depth each of the 2 density elements that constitute to understanding the holistic concept of density.

THE 'HARD' ELEMENT OF DENSITY

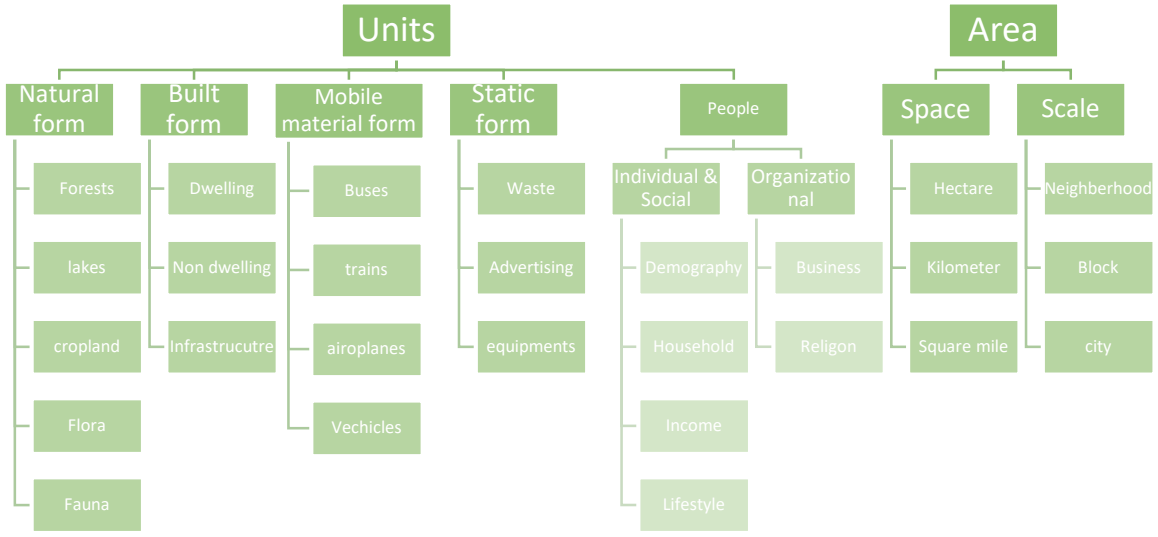


Figure 2, DENSITY; The hard elements of density, number of units in a given area. (Own construction Adapted from Boyko & Cooper 2011)

Although there are many 'hard' or quantitative elements of density, in the context of cities and in the planning of urban areas, two kinds of density are often prioritized in their various contexts: dwelling {Built form (e.g., dwelling density)} and population density {(People-individual and social/organizational (e.g., population density)}. The former may be found in national, regional or local planning policy or guidance and allows decision makers to estimate the requirements for development as well as to determine the form and type that the development will take place. The latter kind of density may be used to inform the debate around housing and built form in cities, but is not enshrined in planning policy per say(Boyko and Cooper, 2013). Population density in a development field might not be a practical measurement because it will be lower with small households such as empty nesters than with large families with several children (Forsyth, 2003). The most widely used method to determine density is dwelling unit (DU) per hectare as it is constant, whereas population is variable based on household size(Sivam and Karuppannan, 2014).Because of this, ***it is not the interest of this paper to deal with population density as it is loosely connected with housing policy***.

Residential density can be measured as dwelling units per land area; habitable rooms per land area; or as stand ratios like Floor area ratio(FAR) or Built up ratio (BAR)(Lategan et al., 2016).

An analysis of international practice indicates that in general, the methods for controlling density fall into two principal categories: -

◆ Dwellings per hectare-Most common in the UK and Ireland

◆ Plot Ratio (i.e. total amount of floor space over total site area)-Most common in other European countries and USA(Government of Ireland, 1999).

Residential density *-i*s an assumption about how many "units" can be accommodated in a given area in attempt to produce an estimate of site capacity. Dwellings per hectare is the most appropriate measure for estimating development in providing a broad indication of the intensity/form of development envisaged on a site or area (Lategan *et al.*, 2016). However, dwellings per hectare is not effective in predicting or controlling the form of development on a site.

Gross residential density- Gross density refers to the number of stands or area used for development, including allowances for roads and other obligatory land allocations, which are excluded from net density calculations(Sivam and Karuppannan, 2014).

Where non- residential uses, such as main roads, retail, employment and major open spaces are being planned in conjunction with housing, an allowance needs to be made in the density assumption for the land that will be occupied by these non-residential uses which may be upwards of 25% at the neighborhood or district scale(Government of Ireland, 1999) or may typically be at least 33% of land is devoted(Sivam and Karuppannan, 2014). Thus, a 'Gross' density measure is best applied to estimating land areas required for mixed use developments involving a number of non-residential developments(Government of Ireland, 1999).

Net residential density- Net density refers to the number of dwellings per hectare on land devoted solely to residential development.(Government of South Australia, 2006). It includes the area occupied by the housing itself, any services and facilities for its immediate benefit(Sivam and Karuppannan, 2014). It is a more refined estimate than a gross site density measure and includes only those areas which will be developed for housing and directly associated uses.

This will include: ◆ Access roads within the site ◆ Private garden space ◆ Car parking areas ◆ Incidental open space and landscaping, and ◆ Children's play areas where these are to be provided(Government of Ireland, 1999).

It therefore excludes: ◆ Major and local distributor roads ◆ Primary schools, religious buildings, local shopping etc. ◆ Open spaces serving a wider area, and ◆ significant landscape buffer strips(Government of South Australia, 2006).

Thus, as the focus narrows and the area becomes smaller, the residential density assumption in terms of the number of dwellings per hectare will rise.

A ***housing unit*** is defined as a separate and independent place of abode, either intended for habitation or not intended for habitation but occupied as a living quarter by a household at the time of census. A housing unit may at the time of census be occupied by one or

more households or may be used partly for living and partly for establishment (CSA, 2007).

Household: Constitutes of a person or group of persons, irrespective of whether related or not who normally live together in the same housing unit or group of housing units and who have common cooking arrangements (CSA, 2007).

Housing Unit Density (HU/Hec)-refers to the ratio of housing units within a given land area.

Household density (HH/Hec - refers to the ratio of accommodated household (number of unit families) within a given land area.

Habitable space - within a dwelling is that which is used as living, dining and sleeping accommodation. It does not include kitchens, bathrooms, toilets, balconies, verandas, passages, storerooms, commercial space or any open space (Tipple, 2000).

Habitable space per person- is the ratio of the total available habitable space to the total number of persons dwelling in that unit. According to Tipple (2000), its increase is a good indicator of success in light of relieving housing stress.

Floor Area Ratio (plot ratio) -Plot ratio expresses the total amount of floor space (habitable space) in relation (proportionally) to the site area(Lategan *et al.*, 2016).

Plot ratios need to be used in conjunction with effective planning standards. They can determine the maximum building floor space area or volume on a given site area, but on their own cannot define built form. This is because the same area or volume can be distributed on a site in different ways to generate very different urban form. Other factors have to be applied alongside plot ratios in order to give a more qualitative definition to the built form such as Height, Public open space provision, Private open space provision ,The standards applied to roads, off-street car parking provision and the like(Government of Ireland, 1999).

Many scholars agree that dwelling per hectare is the most appropriate measure for estimating development land requirements, making housing land allocations.

Governement of Ireland (1999) further adds that dwelling per hectare is most appropriate for estimating the gross or net yield of existing or future housing.

The dwelling per hectare (XX dw/XX he) calculation involves defining both a neighborhood and residential land within that neighborhood (Forsyth, 2003). She adds that unless they is another compelling reason to choose another unit, the neighborhood should be a census tract or a city-delineated neighborhood and should be clearly defined. According to Forsyth (2003), the neighborhood land area Includes in residential land, streets, and neighborhood type uses—schools, parks, churches/mosques/synagogues and neighborhood shopping.

Governement of Ireland (1999) says that dwelling per hectare is not effective in predicting or controlling the form of development on a site. Part of this research's interest is to investigate the physical transformation and the relation between density and physical transformation. As mentioned earlier, plot ratios can determine the maximum building floor space area or volume on a given site area but on their own cannot define built form. *Thus, for the case of this research, plot ratios will to be used in conjunction with dwelling per hectare, household per hectare and building height so as to effectively analyze the density along with the transformation of the neighborhood*.

It is worth noting, however, that residential density and population density both represent averages; therefore, any discussion of density must beware the pitfalls of averages, especially when the area of concern is large (Churchman, 2009).

THE 'SOFT' ELEMENTS OF PERCEVIED DENSITY AND CROWDING

When dealing with the 'soft' or 'qualitative' elements of density, we find that there are three concepts that should be clearly defined and understood. Churchman (2009) cites Alexander 1993 who says three concepts are used to address the issue of density and how density affects people's lives: density (actual), Perceived density and crowding (affective density). As defined earlier by Churchman (2009) density is a term that represents the relationship between a given physical area and the number of people who inhabit or use that area. Perceived density and Affective density (crowding) deal with how density is 'read' or decoded by human beings (Rapoport, 1975). Any environment offers

cues whereby people judge its nature, the potential for action which it offers, and the behavior appropriate to it (ibid).

There is no one accepted measure of density between or within countries or even within metropolitan regions. Researchers often refer to density in relative terms, such as high or medium density, without specifying numbers and high, medium, or low densities may have very different numerical values. This variation makes it impossible to relate conclusions to the objective facts of the density in question.

Perceived density and crowding are based on the principle that the same density can be perceived and evaluated in very different ways, by different people, under different circumstances, in different cultures and countries. Thus, even though planners operate on the level of actual density, they must be cognizant of the fact that people experience and live in a multilevel situation that manifests itself in interactions between density and the perception and evaluation of density(Churchman, 2009) .

> The idea that a quantitative figure for density is not standardized in practice or policy, such that everyone knows, for example, that 50 dwellings per hectare is considered high density, can lead to decision makers making decisions based on unequally-comparable figures. *(Boyko and Cooper, 2013)*

Perceived density is different to the 'quantitative' density in that meaning is given to terms such as "low" "medium" and "high" density. Although terms like High, medium, and low density may have a certain backing from the actual density, they seem to be evaluated in terms of certain implicit norms and potential effects (Rapoport, 1975). And it is this quality of perceived density that makes it an integral part of the notion of density.

> Perceived density is defined as an individual's perception and estimate of the number of people present in a given area, the space available, and the organization of that space. Crowding is defined as the subjective evaluation by an individual that a given density and perceived density is negative crowding, or a perception that there are too many people *(Churchman 1999)*.

Crowding is also defined as a state of psychological stress that accompanies density that is evaluated as too high as crowding is believed to have substantial negative effects on social relations (Baum, Harpin and Valins, 1975).

Scholars have differed on the type of relationship between the three concepts.(Forsyth, 2003) says that Perceived density is not highly related to actual density but is profoundly affected by landscaping, aesthetics, noise, and building type rather than a count of the actual number of units per acre and that Design can make an enormous difference to perceived density.

Churchman (2009) says density and crowding are not the same and are not even related in the sense that there is no direct relationship between density and crowding. According to him, the difficulty in relating crowding with density stems from the fact that density, by itself, does not necessarily generate stress. A feeling of crowding may be occasioned by intrapersonal, interpersonal, or physical conditions or by the interaction between all of these conditions in a given situation. He therefore believes that it is easier for planners to affect density and perceived density than to affect the subjective experience of crowding.

Forsyth (2003) presents a good example in support of Churchman when she says that

> "It is possible to live at very high density in a spacious apartment with no crowding, and conversely it is possible to live in a detached farm house that is crowded in terms of having many people per room."(Forsyth, 2003)

Rapoport (1975) is of the view that crowding defined as a subjective experience is somehow related to density. Yet density is a more objective measure of the presence of other people and their distribution in space. Thus, if crowding is the subjective experience of excessively high densities, then 'designers cannot directly affect it or manipulate it.' What they can do is to control density in its traditional meaning, and if the relation of density to perceived density is known, and the relationship between perceived density and feelings of crowding or isolation understood, then these latter feelings may become more predictable and might possibly be affected by manipulating perceived density (ibid).

Churchman (2009) says there have been two principal ways of distinguishing between density and crowding.

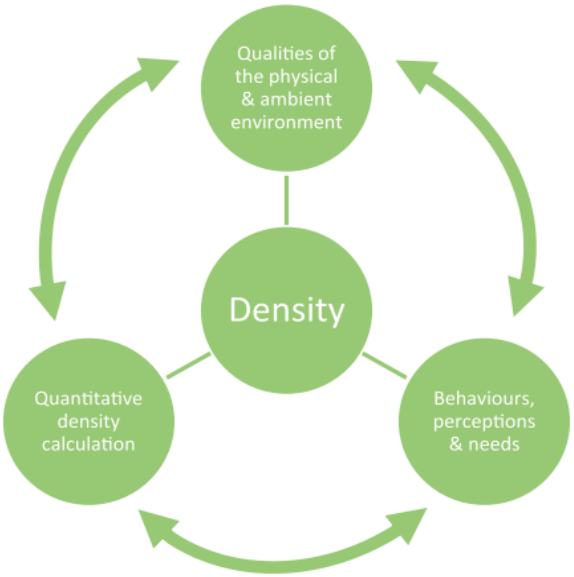
(a) Density can be seen as a site measure, and crowding as a measure of density within the dwelling.

(b) Density can be seen as a measure of people per unit area, and crowding as a negative perception of excessive density or ‘a subjective experience of sensory and social overload’(Rapoport, 1975).

Sivam and Karuppannan (2014) illustrates the following example to better understand the affective density separately from actual density. (see figure 3) the two residential neighborhoods when calculated numerically, have the exact ‘actual density’ but they may not be perceived equally dense due to other factors such as layout, storey height), Design or individual perception.

Figure 3 Perceptive and Affective density examples; source (Sivam and Karuppannan, 2014)

The discussing above is made to reasonably conclude that policy should include both the ‘hard’ and ‘soft’ elements of density. (See figure 5) Currently, policies focus on the ‘hard’ dimension (i.e., the quantitative calculation), providing figures or ranges for ‘optimum’ densities in specific areas. However, a greater understanding of the needs and expectations of different stakeholders and decision-makers as well as the surrounding physical and ambient environment, which includes adjacent land uses are required for density-based solutions to meet the needs of target groups (Churchman, 1999)(Boyko and Cooper, 2011).



Boyko and Cooper (2011) go on to say for density to be a viable concept within practice and policy it should be re-conceptualized to consider all three dimensions (Density, Perceived density and Affective density)together in a more holistic, joined-up and dynamic manner.

Figure 2 New concept of density. Source Boyko and Cooper 2011

Now that we have discussed on 'what density is', our discussion will continue on 'why' the concept of density is important as policy factor for urban form. The next section will deal with the broader picture of sustainability and urban form to discuss causal and co-related factors of density.

2.1.2. Compact city vs. Urban Sprawl

There are two dominant and contradictory theories about sustainable urban form: the compact city and the dispersed city(Holden and Norland, 2005).

The dispersed city commonly referred as urban sprawl origins stem from responses to overcrowding in cities. People felt a need of relieving crowding by "letting in more light and air" thereby leading to a less compact urban form(Neuman, 2005). Scholars have identified four dimensions of sprawl to be: low development density; segregated land used; lack of significant centers; and poor street accessibility (Dieleman and Wegener, 2004). Despite its growing popularity, urban sprawl (the dispersed city) created more scattered residential environs requiring more land, resources, and infrastructure (water, gas, electricity, roads) and lead to a disintegration of the city space, including between socially segregated areas(UN-Habitat, 2012). And for the most part it also meant low rise, low density developments. Sprawl is mostly related to housing demand, as cities will consume new areas if housing demand cannot be met within existing urban boundaries(Lategan *et al.*, 2016). We may define Urban sprawl as follows;

> *Urban sprawl entails a change in land use from the non-urban to the urban, often as new low-density, single-use urban expansion as residential or commercial strip development at or near the urban fringe, with land consumption exceeding population growth, producing a strung out and discontinuous urban form* (Ewing, Pendall and Chen, 2003)

The contradictory dimension of Compact rather than Dispersed city was born mainly because of the need for sustainable cities(UN-Habitat, 2012). The UN-Habitat claimed that Sustainable development is seriously compromised by organizing cities around "urban sprawl" and private car mobility as transport is a main energy user and emitter of CO_2, as well as other pollutants. Furthermore, green areas and open rural fields were actively being converted to urban areas seriously contributing to climate change.

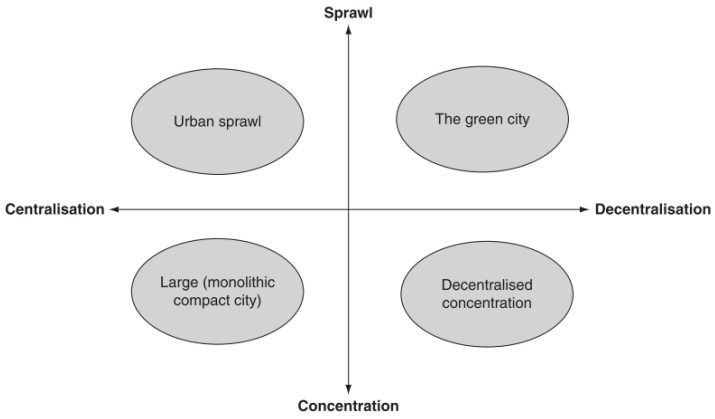
The compact city envisaged concentrating people and activities in urban areas confers advantages(Neuman, 2005). UN-Habitat (2012) claimed that relatively compact and mixed-use, mixed-income areas, which integrate housing, work, facilities and entertainment in close proximity, constitute an important strategy for reducing the negative footprints of urban sprawl. Further to the environmental goals compact, UN-Habitat, 2012) stated that a more compact city will also allow for easier and more affordable access for low income residents to access urban services, employment and a feeling of better sense of community integration than the social segregation urban sprawl created. Thus, essentially the concept of compact city is the exact opposite of Urban sprawl; making people live closer together and share the resources wisely. In response to the already sprawled environments UN- Habitat suggested an extension to the compact city approach where polycentricity or decentralized concentration can redirect development pressures to new urban centers where peripheral development also proceeds in a compact town-size mixed-use development. Compact city has been defined in a variety of ways. One such definition is;

> *Compact city in general is taken to mean a relatively high-density, mixed-use city, based on an efficient public transport system and dimensions that encourage walking and cycling. It contrasts with the car-oriented 'urban sprawl' of many modern towns and cities(Burton, 2000).*

The main justification for the compact city is that it results in the least energy-intensive activity pattern, thereby helping us cope with the issue of global warming(Smith *et al.*,

2012). The process of achieving urban compactness is usually termed ‘intensification’, ‘consolidation’ or ‘densification’, and involves the re-use of brownfield land, more intensive use of urban buildings, sub-divisions and conversions of existing development and an increase in the density of population in urban areas (Burton, 2000).

Figure 3 Models of Sustainable Urban form. Source(Holden and Norland, 2005)



Despite its obvious advantages, compact city has had its share of challenges and critics. For example, scholars like Neuman (2005) claims that despite recent compact city, smart growth, healthy community, and new urbanism efforts, yet if given the choice and resources to exercise it, many locate in the sprawling metropolitan periphery instead of the denser urban core. He terms it as a paradox between *‘Urban desirability and sub-urban livability’* where people enjoy the comfort of low density, low rise neighborhood.

Inostroza (2013) is cited saying that sprawl is inevitable in accommodating the effects of urbanization and population growth and should be tolerated so long as the degree of sprawl is acceptable in maintaining compact and sustainable cities(Lategan *et al.*, 2016). In some agreement to Inostroza, Harry (1997) adds that urban forms should be “compact and humane” meaning that there should be a limit to the amount of compactness a city. The theoretical advantages and disadvantages of increased and decreased density has been studied in many literature. (See Table 2)

Table 1 Advantages and disadvantages of density.(adapted from(Churchman, 2009),(Boyko and Cooper, 2011),(Lategan et al., 2016)

		HIGHER DENSITY	LOWER DENSITY
ADVANTAGES	ENVIROMENTAL	• help protect agricultural land from urbanization • results in less depletion of the natural resources for construction • energy- efficient buildings • Decreased pollution from vehicle exhausts	• Increased privacy More public open space • More affordable for residents due to decreased land costs • Reduces overcrowding
	SOCIAL	• the supply of a variety of housing, employment • services located within walking distance • accessible, comfortable, and frequent system of public • High density frees land for recreation and open space • facilitates more activities in the center of a city • offer possibilities for social support and attachment • enables diversity in the choice of peers and associates	• Greater appeal for residents • Affords more privacy
	ECONOMICAL	• reduces land, infrastructure, and building costs • based on dense construction on high-priced land • affords economies of scale in relation to provision of services and amenities • maintains a high “quality of life” • more spatially and energy efficient • makes public transportation more viable • Promoting a critical mass necessary to support local retail and service areas • Attracting businesses, hotels, shopping and residential development to urban areas	• More space per dwelling as land is relatively cheap • Cheaper construction of housing • Reduced land acquisition costs due to cheaper land on the periphery
DISADVANTAGES	ENVIROMENTAL	• may result in the loss of open and recreational space • more development reduce area’s capacity to absorb rainfall • High-density construction may require high energy use • limits the use of some forms of ambient energy systems • Congestion and pollution may occur • reduced space for trees and shrubs that purify the air and cool the area • reduces the capacity to cope with domestic wastes	• Traffic congestion due to increased need for private vehicles • Increased commuting times due to increased distances • Increased infrastructure and servicing demands
	SOCIAL	• may lead to competition between groups for space and to other social conflicts • may be related to a lower overall sense of community • may promote social segregation • maybe associated with relatively little public open space social gathering • may make it difficult to maintain an automobile	• Social segregation • May decrease social interaction because of low population density versus area • Public transport inefficiency
	ECONOMICAL	• construction may be more costly • operational energy costs of buildings increase • soaring value of land in the city center • Land absorption projects takes longer • may require the very costly upgrading of existing	• Increased commuting costs due to increased distances • Increased land consumption per capita • Increased development costs Inflated property prices

Few researches have been made by planning professionals differ in their opinions about the importance of these goals and whether increased density is the right way to achieve them(Churchman, 2009).

Gorden and Richardson (1997) on the other hand, suggested that the compact city and urban sprawl concepts have trade-offs between agglomeration and congestion. The high density compact city approach involves trade-offs between inevitable costs (congestion) and prospective benefits (agglomeration). An example of such a tradeoff would be high density settlements erected at high cost where considered to be worth the economies realized through increased accessibility and interaction.

On the further side of the argument Jenks et al. (1996) theory challenges the compact city on nearly all land use characteristics by claiming that the most sustainable way to live would be to return to rural areas and local self- sufficiency, to reduce the importing of goods and services from far-off lands, and to commune more closely with nature. Thereby, this theory promotes dispersed, low-density cities(Holden and Norland, 2005).

But of all the claims of compact city, the least explored and most ambiguous is the claim that the compact city is a socially equitable city(Burton, 2000). In her work she explains social equity is where a compact city distributes a range of costs and benefits to its inhabitants in a manner that is fair and just. But it is not a debate whether compact cities are socially equitable or not but that the claim high-density, mixed-use cities have a positive effect on the social equity element of sustainable development has not been supported with empirical research and thus should not be promoted unless proven (Kenworthy, 1992). Burton (2000) goes as far as to say that there are also suggestions that such cities may in fact discourage equity.

Despite critics, the claimed advantages of the compact city are well documented and are being promoted. These include

- conservation of countryside;
- less need to travel by car, thus

- reduced fuel emissions;
- support for public transport and walking and cycling;
- better access to services and facilities;
- more efficient utility and infrastructure provision; and
- Revitalization and regeneration of inner urban areas. (Burton, 2000)

They will be further dealt on the next section

2.1.3. Compact city as a way to sustainability

By the end of the twentieth century, environmental sustainability had become a key challenge for urban developments in most countries and involved housing in crucial ways(Smith *et al.*, 2012). Decades on, UNESA (2018) claims many cities around the world are facing acute challenges in managing rapid urbanization from ensuring adequate housing and infrastructure to support growing populations, to confronting the environmental impact of urban sprawl and to reducing vulnerability to disasters.

Why Sustainable Housing as part of the solution?

It is believed that sustainable housing offers a great spectrum of opportunities to promote economic development, environmental stewardship, quality of life and social equality, while mitigating the precarious convergences of the problems related to population growth, urbanization, slums, poverty, climate change, lack of access to sustainable energy, and economic uncertainty. It is seldom, especially in developing countries, that the social, cultural, environmental, and economic facets of housing are addressed in an integrated fashion(UN-Habitat, 2012). If the new-built housing stock is not built with the utmost attention to sustainability and efficiency (in all senses of these words), it will quickly accumulate a considerable new burden for the environment and the climate, while also multiplying economic wastefulness and social deficiencies(ibid). Furthermore, the United Nations believes that it is only through sustainable solutions that the tensions between economic development, social welfare and equality, urban growth, housing provision, access to clean energy, good quality residential services, and environmental conditions can be alleviated(UN-Habitat, 2012).

There are many definitions of sustainability; yet it is generally agreed the economy, environment and social equity are three prime values of sustainability (Chan and Lee, 2008).

- Social sustainability is improvement and maintenance of current and future well-being and it reduces social inequality and improves quality of life (Sivam and Karuppannan, 2014).
- Economical sustainability of any residential development is the outcome of intensity of density and various design elements (ibid).
- Environmental sustainability at both macro and micro level is concerned with reducing ecological footprint, lower energy consumption and fewer emissions of greenhouse gases(Smith *et al.*, 2012).

The main principle in the compact city theory is ***high-density development*** close to or within the city core with a mixture of housing, workplaces and shops. This implies densely and concentrated housing development, which favors semi-detached and multifamily housing(Holden and Norland, 2005). The claimed advantages of the compact city are currently being taken as an integrated solution to a multifaceted problem. These advantages are seen to contribute to the objective of more sustainable development, in its broadest sense, embracing social and economic sustainability as well as environmental concerns (Burton, 2000).

Below we will see how some of these claimed advantages of compact city contribute towards sustainability.

i. Better Access to Facilities

It is argued that, in a compact city, not only are households in closer proximity to facilities but there are also likely to be a greater number of facilities per head of population because minimum densities of population are required for facilities such as retail to be economically viable (Burton, 2000). These are significant advantages for low-income households, as many have no access to a car and public transport can be too expensive to use.

ii. Poor Access to Green Space

Higher urban densities imply greater use of urban green or open land for development. And a possible advantage of the poor to get easier access within their neighborhood. Many European towns and cities have adapted a compact-green city fusion, where a relatively compact built environment includes a diversity of densities and designs and maintains a good coherence with the landscape and green environment(UN-Habitat, 2012).

iii. Better Job Accessibility (Proximity of Home and Work)

Supporters of the compact city claim that it has the potential to reduce the separation between home and work and thus the time and money spent on commuting (Burton, 2000).

iv. Better Public Transport

It is generally accepted that public transport works better in compact cities owing to the tendency for a larger population to live within easy access of a stopping-point says Goodchild (1994) as cited in (Neuman, 2005). suggested that higher-density cities are associated with a high use of public transport: public transport declines as density drops and falls away at around 20–30 people per hectare (Burton, 2000).

v. Greater Opportunities for Walking and Cycling

The compact city is perceived to be a pedestrian friendly city or a ‘walking city’, a more equitable alternative to car-led urban sprawl. Researchers, like Neuman (2005) and Kenworthy (1992), provided evidence of a clear relationship between low-density areas and a high per capita petrol consumption.

vi. Reduced Crime

Within the sustainable development debate, urban compactness is generally thought to have the potential to reduce crime because of ‘Fear of crime’ and natural surveillance. (Burton, 2000).

In The Death and Life of Great American Cities, published in 1961, Jane Jacobs argued that the presence of 'eyes on the street' deters wrongdoing and promotes personal safety, (Wheeler and Beatley, 2009).

vii. Lower Levels of Social Segregation

It is widely argued that, in the compact city, communities are likely to be more mixed and that low-income groups are less likely to suffer from the added disadvantages of being spatially segregated. This argument stems primarily not from observation of urban living but from evidence of apparently increased segregation as a result of urban sprawl(Burton, 2000). It is also observed that in low-density suburbs the interaction is less whereas in medium and high density it is more(Sivam and Karuppannan, 2014).

Generally speaking, when it comes to the claimed advantages of compact city, Holden and Norland (2005) states that most of the issues of compact city towards sustainability must be treated as a hypothesis, rather than a fact and, therefore, the relationship between each and the built environment should be regarded as a subject for research. There is an exception in terms of carbon emissions, it has been proved that the dispersed city, consisting of individual houses, is a bigger source of carbon emissions than the compact city(a+t research group, 2015).

2.1.4. `Density, design and policy in compact city model

It is generally assumed that higher density developments are more sustainable (Sivam and Karuppannan, 2014). But Poulsen & Silverman (2006) say that although densification is commonly pursued as a planning and sustainability goal "urban density on its own is no panacea for prosperity". Density should be considered as a valuable condition that supports resource efficiency and human interaction, but is not sufficient on its own and does not guarantee positive outcomes such as more sustainable urban environments. What then are the other factors for creating sustainable developments?

I. Design
II. Policy

The advantages of compact city are mostly the effect of intensity of interactions among dwellers. The need for higher densities are thus justified by supporters of compact cities to increase these interactions on a meaningful scale at a social, economic and environmental levels. Forsyth (2003)adds that density itself cannot create good or bad environment because density is only a measurement and not an independent factor that could create good or bad urban fabric/built environment. Then, one can logically deduce that Intensity of interaction is not only a factor of higher density and that density should be designed for systematically to achieve 'compactness without crowding'(Churchman, 2009). Forsyth (2003) argues that higher density has many advantages in terms of efficient use of infrastructure, housing affordability, energy efficiency, vibrant street life that improves social interaction however, that density alone is not sufficient to create a good urban environment, and it requires appropriate design. Sivam and Karuppannan, (2014) tells us that there is a strong relationship between density and design. Density as a measurement but design as a tool, which creates the built environment. Therefore, both density and design play an important role to create desirable and sustainable built environment in various cultural contexts. The authors further illustrate how intensity of interaction is very much related to design elements by giving an example of 'U' shape layout. The 'U' shaped layout increases the interaction in a Pedestrian oriented neighborhood because it provides a common entry point for everyone and common area for passive and active recreation at residential and community level.

But, Lategan *et al.* (2016) say we cannot always assume that increased densities are universally positive when compared to lower density arrangements. This side argues that there is a level beyond which density creates social, economic and environmental congestion and undermines sustainability. In some developing regions, many denser residential areas are associated with poverty and overcrowding (Sivam and Karuppannan, 2014). If so, how dense should a "compact" neighborhood be?

Good environmental practices suggest moderately-high densities for compact neighborhoods. However, the actual density needs to be context-specific (Boyko and Cooper, 2013).

That is where Density policies come to play. Smith *et al.* (2012) says Policy-makers have to balance the competing and increasing demands for welfare assistance with the need

to plan and regulate for appropriately dense settlements, compact residential buildings, and efficient infrastructure to service cities with adequate sources of water, energy, waste treatments, and transport services. The developed nations like England, and Australia gear their policy towards Brownfield development because its potentially beneficial impacts in preventing urban sprawl, keeping cities compact and reducing out-migration(ibid). Developing Nations like Ethiopia have recently adapted the Urban renewal and upgrading scheme to create more compact and dense settlement.

Policies of density arise from different context specific parameters. From the Government side, Polices promoting higher density have gaining momentum in cities around the world(UN-Habitat, 2012). Boyko and Cooper (2013) conducted a survey to better understand the reasons why cities wish to increase urban densities. They found out that the top drivers for increasing density in descending order were;-

- Efficient use of land
- Increased profitability/return on investment
- More use of public transport
- Efficient use of resources
- Promoting a critical mass to support services
- More people immigrating to cities
- Creating area employment
- Improving housing choice and affordability
- Less use of private transport
- Reduced energy consumption
- Increasing diversity of an area (Boyko and Cooper, 2013)

This shows us that many density policies at national, regional and local levels are designed to bring about the above stated advantages while at the same time mitigating the very practical issue of congestion in urban centers and its consequent knock-on effects to the economy, the environment and society(Boyko and Cooper, 2013).

2.2. HOUSING AND TRANSFORMATION

2.2.1. What is Housing transformation?

Studies related to housing transformations use terms like 'Extension', 'Backyard Development', 'Infill development', 'dweller-initiated transformation' ' spontaneous transformation' 'Incremental housing' to describe the nature of housing transformation. Although housing transformation can be of various types depending on the condition and site understudy, for the sake of this research, we will use the following categorical definition

> Housing transformation is defined as any authorized or unauthorized changes, alterations, additions, extensions or any modifications of both or either of the internal space or external form of dwellings already deemed developed by authorities according to their zoning policies, in order to improve the physical , social, cultural and economic condition of the house.
> *(adapted from (Tipple, 2000)(Lategan et al., 2016)(Shiferaw, 1998)*

Transformations of human settlements are very dramatic in cities of the developing countries than industrialized countries (Shiferaw, 1998). He claims the reason is what he calls "housing Stress" or the 'Housing squeeze'. according to (Tipple, 2000). This occurs when direct government provision of low-cost housing featured in the policies of most developing countries, has been proved unable to address the increasing housing needs of the poor (Turner, 1976). This profound deficiency manifests itself in self- help emergency solutions in the form of mushrooming of overnight squatter settlements and extending and subdividing existing houses resulting in continuous transformation of shelters in order to meet basic needs and changing situations (Shiferaw, 1998). But according to Khan, (2014) housing stress does not necessarily bring in any immediate change to cover up the gap between actual and preferred level of housing consumption. She says that dwellers first try to readjust by showing what she terms as 'Level of tolerance' until a critical point is reached. When such a point is reached by a household they tend to make a tradeoff between action and Non action, 'moving' or 'improving'. There are differences of actions according to tenure. If the households are tenants, they usually do not have the option to improve by themselves, so they can either tolerate or

‘move’ out. In case of the household are owners, they have an option to transform thus opting for ‘improving’ as an action (ibid).

Among the general nature of their housing transformation, is that they are mostly incremental. The incremental process of housing construction that usually low income group employ allow them to build dwellings according to their needs and with the cost they can afford. Low income group usually construct their houses with low cost; locally available building materials which in most cases is in contrary with building standards and regulations (AlemayehuHailemariam, 2015). Such housing transformation have two main arguments. The first one is that such transformation are essentially ‘Building slums’ and the second is that they supply low cost shelter in nations where the housing shortage is acute (Tipple, 2000)(Miller and Wheeler, 2014).

Another general nature of housing transformation is that they are largely accomplished through spontaneous private initiative(Shiferaw, 1998). This holds true for private, government provided or for even government-owned housing (ibid). This phenomena is easily explained by the fact that self-initiated transformation are relatively cheaper and are done at the pace and economic capacity of dwellers. But not only is self-transformation economical, Tipple and Ameen (1999) and Shiferaw (1998) agree that it is a valuable resource for improving housing conditions and providing new stock of housing cheaply than new-build projects.

Yet another nature of housing transformations is that they are conducted for personal reasons where people subdivide the given room and make extensions in their own ways using materials that suit the local climate and their economic capacity. Thus bringing about subjective inputs on the given structures and make a home out of a house (Shiferaw, 1998). Such transformation allows households to adjust their housing at their own pace and in their cost limits, and allows residents to express themselves through their built environment(Tipple, 2000). Motives and contributory factors of housing transformation will be discussed in section 2.7 on page 29.

There are various types of transformation but Tipple (2000) in his book divided transformation into simple and complex. In simple transformations, extension of existing homes increases the size of the house without major changes to the original layout. In

complex transformations, extensions create more rooms and the changes are more sophisticated in both layout and function. Transformations may be carried out once or phased step by step so that the process extends for several years.

(Khan, 2014) also divides transformation into two levels but she named them Building level Transformation (BL) and Partition level transformation (PL).The building level transformation is majorly to do with the External features of the house like extensions and change of building materials. The Partition level transformation is a type of transformation that doesn't not affect the external but modification and alteration of interior spaces through adding or removing inner walls. BL can also include PL activities as new external elements have their own interior elements but not the other way around.

Tipple (2000), in his book *'Extending themselves: user-initiated transformations of government-built housing in developing countries'* has done extensive research on housing transformations in Bangladesh, Egypt, Zimbabwe, Ghana & Malaysia. He found out that the occupants of government-built housing often make unauthorized changes and extensions to their dwellings in order to improve the physical conditions of the units or to meet the need for more space or privacy. Based on the Empirical research he and his team had undertaken, the book concluded that transformations are a form of sustainable development because they improve the condition of housing, utilize existing resources, and encourage people to get involved in caring for their environment. Furthermore, extensions increase population density and reduces urban sprawl and ensures that resources are used efficiently(ibid).Lategan *et al.* (2016) in their study in South Africa claimed that transformations supports to make improved use of existing infrastructure networks and capitalize on existing investments by providing a more sustainable number of users. Shiferaw (1998) in his study on three residential areas in Addis Ababa, explained that extensions to government-provided dwellings represent a valuable resource of improving the housing conditions of the low-income group and also helped people who are expected to be just consumers of housing turn out to be providers of housing.

In expressing his unwavering advocacy to housing transformation Tipple said in his book

> "Just as the sheer ubiquity and scale of squatting in the 1960s led writers and officials to argue that something had to be done to allow, regularize and improve such development, we can argue that one part of the case for transformation is its widespread popularity among residents."(Tipple, 2000)

The case of transformation is not without its disadvantages, drawbacks or critics. Despite its potential in terms of affordability and supply of houses for urban poor and as means of income generation for the improvement of the livelihood of low income groups, there are scholars that cautions against excessive transformations as a strain on already over capacitated infrastructure networks and creating uncontrolled overcrowding. This side of the argument will be discussed broadly on section 2.8 on page 35.

2.2.2. Motives, Factors and Impact of transformation

Motives of Transformation

Turner (1976) in his well-known book 'Housing by People" differentiated housing as a Noun from Housing as a Verb in which the former deals with housing as a product and the latter as a process. He argued that housing should not only be valued as a manufactured house for people to live in but as a process in which a house is created, transformed and upgraded.

Our understanding of transformation stems from Turner's concept of housing as a process. It then becomes clear that once a house is erected for dwelling purposes, it may be transformed as the need of the dwellers change through time. Dweller-initiated transformation are thus a means by the users of the household be improve their housing according to both need and capacity of their own.

In order to better understand the explicit motives behind transformation Khan, (2014) lists out four core reasons of transformation by translating Glasser's (1998) five particular

internal needs that shape human behavior in the scope of housing transformation. They are;

1. Transformation to Survive

Few households are likely to remain completely satisfied with the same house indefinitely since the needs for survival of family life constantly change (Seek 1983). This endless and ever-changing list of 'housing needs' creates a 'housing gap' between current level and preferred level of housing. Tipple (2000) agrees and adds that the most common 'housing needs' are demographic and economic needs. Many researchers establishes that • Increase in number of households • Children getting older • Better arrangement of spaces to suit changing family needs are the major demographic reasons for transformation. Transformation due to the need for extra income such as • to increase rental income in the form of habitable flats • To increase rental income in the form of renting shops, or offices • To increase income by transforming part of the house for home-based enterprises (Ibid). Khan (2014) further adds Change of ownership can also create the need for transformation.

2. Transformation to belong and Have freedom

Turner (1976) stated that people want to have the freedom to make own decisions on how they would live as It brings them satisfaction and a sense of self-belonging in their houses. Thus, provided that people have the means of survival, they are willing to change their households for the mere satisfaction of turning a house to a home.

3. Transformation to have power and control

Glasser says that it is a human's nature to show power. "Man wants to have control on certain things around their surroundings." he claims. For example, in a family, the head might show that power over the rest of the family in making certain kind of decisions on how the house should be like.

4. Transformation to have emotional fulfillment

The emotional issues play a major part in human behavior. When it comes to housing decisions, emotions are not less significant. The other 3 Points mentioned above are much stronger, and probably more influential behind transformation and might hide the trace of emotion behind that particular transformation incident. Transformation due to emotion may be subtle much like the way a user of a house arranges utensil and furniture according to (Khan, 2014).

Essayas (2000) in his study in about low income housing transformation concluded that there are four major reasons that household resolve to transform their house. They are

I. Economic demands
II. Social demands
III. Cultural demands
IV. Environmental demands

By economic demands, he suggests that dwellers are willing to decrease from their net living area or open space to increase the household income. This is done by creating rentable spaces and introducing home based enterprises.

By Social demands, he explains that households transforms because of the change in household size and social structure. Formation of the extended family and accommodation for relatives are among such social demands.

By cultural demands, he explains that lifestyle and activities are an expression of culture. And if people can have their identity incorporated into a house within the budget of transformation they can afford, they do so. A good example is the need for privacy, comfort and security. Also an expression of eccentricity and identity in which to distinguish from neighboring row houses.

By environmental demands, what is meant is the achievement of thermal comfort, sufficient natural lighting, good level of building finish materials and an acceptable level of sanitation and clean surrounding.

To Understand the correlation and link between the Essayas (2000) and Khan (2014) explanation of the motives of housing transformation, we may use the table 3.

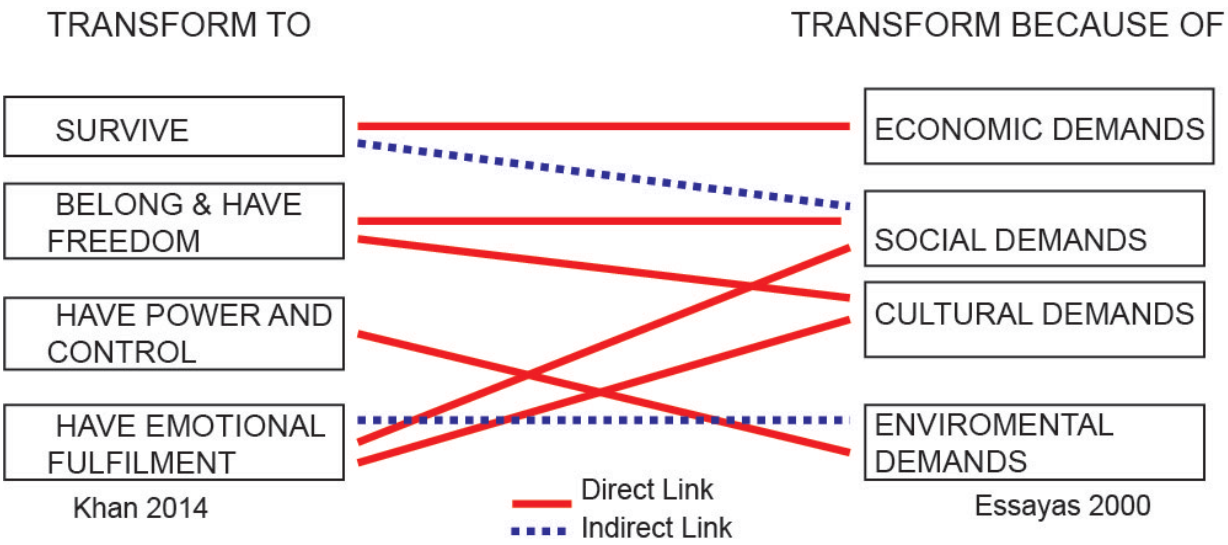


Table 2, Co-relating Motives of Transformation

AlemayehuHailemariam (2015) in his study on a residential neighborhood in Addis Ababa identified Accommodation of married children , Rental income, accommodation of matured children, To run home based business and Extension motivated to add functional room to the main house as main reasons for user initiated transformation. Shiferaw (1998) after his study of three settlements in Addis Ababa and claimed there are three primary functional motives of transformation and other preferential ones. The primary motives are socio-culturally determined aspirations, growth of family size and desire of generating income (subletting, kiosk, stable, local bar, handicraft). Other preferential reasons are response to harsh climatic conditions like choices of enclosed and covered outdoor, and desire to copy prevalent housing forms such as people's attribution of status or prestige to certain types of materials and house forms can also influence the transformation form to some extent (ibid).

Factors for Transformation

Despite a strong motive towards transforming houses, there are common factors identified by researcher that affect the occurrence and process housing transformation from beginning to end.

Tipple (2000) cited Carmon (1984) that majority of occurrence of housing transformation are on self-built housing. This may be because of a higher level of security of tenure that (Carmon 1984),(Tipple and Ameen, 1999) all agree is a catalyst or even a pre-requisite to for housing transformation. Turner (1976) further says that the willingness to invest on transformation depend on the satisfaction with the anticipated result.

On explaining the factor behind transformation, Williams and Hardman (2005) say external factors such as security of tenure, ability to secure finance or loans and internal factors such as desire to improve livelihood or desire to increase space influence dwellers to invest on housing transformation.

Essayas (2000) in his study of transformed dwellings in Addis Ababa, categorized contributory factors for transformation into four.

1. Situation of Housing – Depending on where in the plot or in the city the house is located, the transformation type could vary
2. Availability of resources – This is an ability to get an investment surplus from non-housing cost of the transforming family for the construction.
3. Physical condition of dwelling – smaller dwelling units are more liable to be transformed given other conditions are similar mainly because of high occupancy per room.
4. Tenure – is the single most limiting factor to transformation. People with less secure tenure tend to go to non-action tradeoff such as moving according to(Khan, 2014). Dwelling with title deeds are more likely to transform than other tenure types and tenants do not transform at all.

Impact of Transformation

It is clear from the above discussion that transformations of houses are in response to the need to satisfy social, cultural, economic, and environment demands of the households. In other words, the motive of transformation in a nutshell is to improve dwellers living conditions in these aspects. But it should be noted household transformation on a house to house level (micro level) can have an overall direct or indirect impact on the neighborhood (macro level) beyond the perceptive of individual transformers. One such impact is the impact it has on residential density which is the focus of this paper.

Dweller transform for personal reasons. A multiple effect of each transformation has very evident environmental impacts. Essayas (2000) mentions the impact on • resources, • living conditions and • Infrastructure and services

Tipple (2000) and Lategan *et al.* (2016) mention that transforming has an overall positive impact on • Density, • sustainability and • country's housing stock.

Resource Use – Public resources such as land are impacted by transformation. Less new unban land is needed for sprawl as serviced urban land is better utilized. The type of material used for construction can also affect the environment either positively or negatively.

Living Conditions – Living conditions change after transformation. Among these changes as changes in occupancy level, sanitation facilities, privacy and comfort.

Infrastructure and service facilities – Schools, health services, and other social amenities may develop as an impact of transformation and density. Also management of solid and liquid waste is affected by increase in population brought about by transformation. Infrastructure lines could be strained as they are not designed to accommodate a large population.

Density – Greater level of density than was originally planned could be absorbed into a neighborhood because of transformation. The greater the density, the more the effect of transformation will be felt by the environment. Densification makes improved use of existing infrastructure networks and capitalize on existing investments.

Sustainability – transformation can absorb a large proportion of households who would otherwise occupy sprawling informal settlements. As discussed in Section 2.1.4 the compact city has being established as a way to sustainability.

2.2.3. Benefits & Potentials, Challenges & Drawbacks of housing transformation

We have already established that housing transformation is evident and especially when housing needs are not met through the formal system. We will now be dealing with the advantages and disadvantages of transformation from the household level to the city level. When considering transformation and its impact on the environment, two main arguments have emerged. The first supports transformation to make improved use of housing and existing serviced land and capitalize on existing investments, by providing a more sustainable number of users The second argument warns that it is essentially building slums (Tipple, 2000). The following discussion will focus on underlining the benefits and drawbacks of housing transformation.

2.2.3.1. Benefits and Potentials of housing transformation

A. Transformation creates housing stock for the poor

Tipple (2000) says that the most important feature of transformations is that they provide large amounts of new housing goods and in ways which are unlikely to occur on new sites or through government interventions. Transformation increases the amount of housing available in the already built-up area and in so-doing houses increase their size and also accommodation is provided for many extra households ranging from low to middle income. This is especially advantageous in Ethiopia as there is acute housing shortage and government is mobilizing to increase the rate of housing supply and to involve all actors in the housing process.

Shiferaw (1998) says self-initiated transformation represents a valuable resource for improving the housing conditions of the low income groups because most developing countries lack the resources and the land to construct housing for the low income, extension of existing homes is the best option that can be used to increase the housing stock.

Lategan et al. (2016) claims that transformation creates housing stock especially for the low income because many extensions are constructed around the needs of tenants.

Nguluma (2003) agrees that transformation made a way for many poor urban residents to access urban housing which the government was unable to address their housing demand in the formal low income groups housing provision methods.

B. Transformation increases rooms and decreases occupancy

Tipple (2000) says the main aim of any successful housing supply policy in the context of housing shortage is creating more space per person. This means increasing dwelling space and decreasing occupancy rates. Success in either or both of these is an indicator whether extension activity succeeds in relieving housing stress or simply creates more space for more people to crowd into (allows an increase in population without improvements of most people's occupancy).

Tipple's empirical data proves that through transformations families firstly, increase the number of rooms or space in their houses, Secondly, and provide low cost housing for tenants whose needs are often not met in government projects largely without compromising their own net habitable area. It is a 'win-win' situation. If transformation is made to benefit only the original dweller then we would expect main households in transformed houses to have more habitable rooms than non-transformers. One the other hand, if transformers transform to build rooms for rent purpose we would expect to be no difference in rooms and space occupied by the transformers. But evidence from Tipple's data shows there are lower occupancy rates for the main households and even occupancy rates for subsequent households are not much higher than main households.

C. Transformation make housing affordable

Tipple and Salim (1999) say that transformation is affordable both for the transformer and tenant. Transformation allows households to adjust their housing at their own pace and in their cost limits, and allows residents to express themselves through their built environment. It provides housing much more cheaply than new-build projects. Standards of finish are generally higher than existing structures(Tipple, 2000).In addition, most transformed houses have semi-private space and this allows owners to rent out room by room which is convenient for the poor who cannot afford self-contained units.

Turner (1976) says studies show house transformation has great potential in terms of affordability and supply of houses for urban poor and as means of income generation for the improvement of the livelihood of low income groups.

Essayas (2000) supports this claim in his study in Addis Ababa. He says transformation increases the livable spaces which help the households to generate income to improve the physical condition of the housing units and for the improvement of their livelihood. It also provides more housing options for the need of tenants.

Tipple (2000) argues that transformation allows economic activity in the houses (home-based enterprises) including renting rooms (passive), retailing and production (active). This means that people can work close to dwelling and also market and retail services are available for the neighborhood use.

D. Transformation mobilizes local labor and resources and empowers residents

To transform their house, dwellers mainly employ 3 methods. Hired contractors, Local artisans and aided self-help. Transformers tend to rely on small contractors or artisans to build extensions and since the process is labor-intensive, it creates jobs for the local labor force(Miller and Wheeler, 2014).

The process of transformation is also seen as a civic participatory engagement(Tipple, 2000). The involvement of residents in the process of neighborhood development engenders a sense of belonging and care for the environment. This is because transformations have the potential to involve local people in environmental improvements at an intensity which is difficult to imagine through any other means except total self-help (ibid).

Nguluma (2003) Transformations should be seen as an empowering process where residents have empowered themselves and attempted to improve their living conditions. By perusing housing transformations people have managed to organize and address housing problems through labor intensive technology utilizing low- income local craftsmen.

E. Transformation decrease sprawl, encourages urban density and sustainability of the built form

Lategan et al. (2016) after his study says densification is commonly pursued as a planning and sustainability goal. Without transformation, dwelling areas would display dwelling unit densities below that of envisioned by the government. Transformers rent out dwelling units to tenants whose main motivation is to get access to urban services. This increases the density of the area by absorbing a large proportion of those households who would otherwise occupy sprawling informal settlements.

AlemayehuHailemariam (2015) in his study of secondary units says that this units have the capacity to accommodate a significant share of future population growth. In addition they have economic and fiscal benefit to the city in that they are likely reduce parking requirements by not contributing to parking demand because tenants are less likely to own a car. This in turn creates a compact residential area with walkable service access.

Tipple (2000) says the new population of transformed houses is more varied and so gives better age and income balance for the demand for neighborhood facilities such as market, shops, kiosks etc. and public services such as schools, health centers etc.

F. Transformation increases valuation

According to Tipple (2000), transformations increase fixed capital stock. His study concluded that there is a general increase in house value following transformation activity, which would not be expected from any activity which worsens housing conditions. Tipple and Ameen (1999). In fact, no evidence was found of devaluation of surrounding and non-transformed houses.

Shiferaw (1998) says that transformers can change the functional characteristics of low-income government housing in such a way as to greatly increase the market and use value of the dwelling at no direct cost to government. This is because, as stated above, transformers can mobilize their own resource into improving their environment.

2.2.3.2. Drawbacks and Challenges of housing transformation

a. Transformations are unplanned & uncontrolled

Tipple (2000)housing provided by transformers is usually unplanned and uncontrolled. This means that they pose difficulty in predicting its consequences for the physical and demographic conditions in the neighborhood.

Khan (2014) in her study found that public amenities such as roads could be narrowed and zigzagged by unplanned encroachment of non-conforming activities. These non-conforming (commercial and industrial) uses can create negative externalities such as noise, traffic jams which may reduce the enjoyment of the residential area and lower market values.

Transformation of residential areas also lead to a shortage of open space and play ground. Non-residential elements could lead to social ills such as crime of the residential area(AlemayehuHailemariam, 2015).

b. Transformation create sub-standard housing

The standard of the house can be lowered by the functional arrangement, the material used and the building construction method.

Shiferaw (1998) says that materials used in extension processes are not durable and sustainable as householders can't afford to buy durable ones. Furthermore, lack of lighting, ventilation, blocking of roads and open spaces, overcrowding and building on sewer lines have also been documented. Tipple (2000) has also identified some problems of inadequately ventilated small rooms and very high plot coverage minimizing open

space and creating environmental problems. This makes the transformations look chaotic rather than disciplined, they do not follow current government standards, they 'spoil' the look of the neighborhood(Tipple, 2000).

Nguluma (2003) noticed that almost all transformations are horizontal resulting in relatively high plot coverage. This implies that outdoor spaces to facilitate cross-ventilation are dramatically reduced. This is especially disadvantageous in an inner city locations where vertical density is could have accommodated increased density with lesser plot coverage.

c. Transformations are inefficient

Shiferaw (1998) says that due to several limitations transformations show inefficiencies related to quality and resource uses. Of these inefficiencies is that in all cases extensions take place horizontally consuming the limited resource of land and requiring large external surface area to protect the house.

AlemayehuHailemariam (2015) pointed out that they are inefficient in that they take a long time to build. He added, imperfections of construction arise due to lack of experience of builders. And construction methods has not improved since modern techniques of mass production is not used.

d. Transformations cause over-crowding and strain Infrastructure

Tipple (2000) says that transformation encourages increases in population leading to higher demand for utilities and public services. Service lines are likely to be compromised by the narrower and less regular spaces between buildings and encroachment onto road reserves and access lanes.

Lategan *et al.* (2016) cautions against excessive densification as a strain on already over capacitated infrastructure networks. This can be caused as infrastructure networks are generally designed to service the very low densities planned for in subsidized housing projects. The intense densification introduced by transformation tenants may place immense pressure on networks and counter the potential of transformation to introduce increased densities sustainably (ibid).

Poulsen & Silverman (2006) says local authorities generally view the increased densities introduced by transformation negatively. This is due to the burden placed on municipal infrastructure. Municipalities can't generate an additional income through ***rates*** *and* ***taxes*** on newly introduced tenants making them unable to generate finance and resources to improve infrastructure to the transformed neighborhood. As such, financing basic urban services remains a formidable challenge to sustainable urban development.

It is clear from the above discussion that transformation brings with it enormous potential and simultaneously serious challenges. But literature written on dweller initiated transformation after studies in different part of developing countries such as Ghana, Egypt, Tanzania, Peru, Bangladesh, Malaysia, South Africa, Nigeria and Ethiopia don't incline to the prohibition of transformation as the solution. In fact, (El-batran and Arandel 1998, Khan 2014, Lategan *et al.* 2016,Nguluma 2003 ,Shiferaw 1998, and Tipple 2000) are all of the opinion that transformation should continue in a structured and regulated manner. Furthermore, Shiferaw (1998) believes that neither transformation activities nor prohibition of it could be an effective response.

In light of the Provider vs. Supporter paradigm shift, Tipple (2000) suggests that government should adopt an essentially permissive attitude towards transformers, with minor controls to improve use of space and minimize interference with neighborhood level services. In fact, governments have much to lose through heavy handed, unhelpful policies which freeze out potential extensions through introducing bureaucratic delays and interference(Tipple and Ameen, 1999).

Shiferaw (1998) is of the opinion that despite the inefficiencies associated with transformation, if the process is organized and supported by external resources, the transformation initiative could be a very productive input in generating incomes and in contributing to the national economy.

One of the inefficiency is that transformation are unplanned. And in planned areas are resulting in higher densities and lower standards whereby a convergence between planned and unplanned areas could be observed.

Shiferaw (1998) recommends that these elements should be carefully studied and formulated as the basis for the appropriate standard which is not so high as to be unattainable or so low as to yield undesirable effects. For example, defining streets, corners and open spaces through planned buildings and outlining of part of houses could guide self-help activities within the framework of development plans.

Regarding transformation and infrastructure provisions, Tipple (2000) says there is a need for infrastructure surveys in areas where transformations are taking place or might be expected. This helps to know how much load the current infrastructure can cope with, so that adequate response can be made to increasing demand. Lategan et al., (2016) adds that when planning new low income residences the effects of transformation on future spatial and land-use planning and municipal infrastructure management cannot be ignored.

In Addis Ababa, the case in not much different. Despite the inefficiencies, housing transformation provides more shelter than any other form of building in Addis Ababa according to (Shiferaw, 1998). Low income group, even under the limitations, mobilize their resources and make vital improvements to their own houses at no direct cost to the government and much better than the public systems do. At the same time, they generate income through subletting extended rooms and using part of the house for informal productive and business activities. All of these activities are achieved on a given plot, which enormously increases the building density. Furthermore, labor-intensive building methods, local skills and materials are used(Shiferaw, 1998).

If these spontaneous and individual actions are, however, not technically, logistically and legally supported by the formal sector, the structures would remain inefficient and unsatisfactory resulting in inferior structure.

3. CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

According to Zegeye *et al.* (2009)Research is defined as human activity based on intellectual application using systematic process of collecting and analyzing information to increase our understanding of the phenomenon under study. He adds that in any scientific research, methodical study is needed in order to prove a hypothesis or answer a specific question. That methodology must be systematic and follow a series of steps and a rigid standard protocol.

To this end, the following section will discuss the research design and the methodology used to conduct this paper.

3.2. Research design

(Walliman, 2011) says that the choice of which design to apply to a research depends on the nature of the problems posed by the research aims.

Description is the first step in research since it provides the basis for further exploration about the phenomenon under consideration. In description, the researcher attempts to find answers to questions “what,” “who,” and “where?”(Zegeye *et al.*, 2009). It is only after the description that a research can further explain, compare, explore or predict outcomes (ibid).

Given the nature of the research question of this paper, the research is a ***descriptive research*** with elements of analytical research to understand the how of what was described.

In a descriptive research, research design relies on observation as a means of collecting data. It attempts to examine situations in order to establish what is the norm, i.e. what can be predicted to happen again under the same circumstances. ‘Observation’ can take many forms. Depending on the type of information sought, people can be interviewed, questionnaires distributed, visual records made etc. (Walliman, 2011).

The goal of descriptive research is to describe status of a given phenomenon. It can help understand a topic and lead to causal analysis. In order to achieve its goal, it involves a variety of research methods. The methods that come under descriptive research are:

- Surveys
- Correlation studies
- Comparative studies
- Case studies(Zegeye *et al.*, 2009)

In this particular research, all 4 methods are used. The selection of these methods is for the following reasons

1. Survey data can • represents a wide target population • generates numerical data; • provides descriptive, inferential and explanatory information; • manipulates key factors and variables to derive frequencies; and(Zegeye *et al.*, 2009)
2. Correlation -can examine an associational or causal relationship -identify dependent and independent variable -find out influence factors between two concepts. (Walliman, 2011)
3. Comparison can compare past and present or different parallel situations, can help determine variables - can look at situations at different scales, macro (international, national) or micro (community, individual).(Walliman, 2011)
4. Case studies can provide very engaging, rich explorations of a project or application as it develops in a real-world setting (Zegeye *et al.*, 2009).

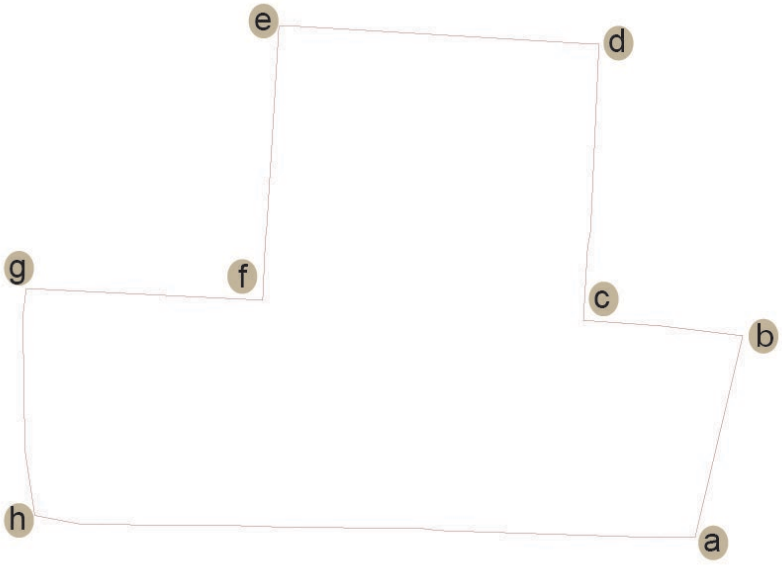
Another design approach that this particular research has taken is that it employs both ***Quantitative*** and ***qualitative methods***. This was selected considering the following words of (Strauss and Corbin, 1998) whose view is that each method is complementary/supplementary to one another.

> "Many quantitative researchers are apt to dismiss qualitative studies completely as giving no valid findings as it ignore representative sampling, with their findings based only on a single case or a few cases. Similarly some qualitative researchers firmly reject statistical and other quantitative methods as yielding shallow or completely misleading information and ignorant towards cultural values and social behavior. However, there are intermediary positions. Combining methods may be done for supplementary, complementary,

informational, developmental, and other reasons. Only with this use of qualitative materials, basic to (although only supplementary to) statistical procedures and analyses, could questionnaires tap “reality.” Parallelly, counting, measuring, and even statistical procedures can usefully supplement, extend, or test ways of doing qualitative research.”

3.3. Study area

The study area is located in the Kolfe Keranio sub-city, Woreda 07 in what is commonly referred to as Betel Area, Addis Ababa, Ethiopia.



a. 9° 0'4.16"N, 38°41'34.00"E
b. 9° 0'7.27"N, 38°41'34.64"E
c. 9° 0'7.55"N, 38°41'32.10"E
d. 9° 0'12.10"N, 38°41'32.38"E
e. 9° 0'12.45"N, 38°41'27.26"E
f. 9° 0'7.82"N, 38°41'27.02"E
g. 9° 0'8.03"N, 38°41'22.89"E
h. 9° 0'4.45"N, 38°41'22.92"E

Figure 6 Geographical co-ordinates of study site

3.4. Selection of a case: Why Mekelakya Sefer?

According to Tipple (2000), household transformation is a common phenomenon in many housing typologies and in many developing regions. He also mentioned that transformation occurs on available land at the front, back or sides of existing households either as attached or free standing elements.

My interest in this study is how transformation will look like with a small sized plot with limitation to available free space of transformation and investigate the relation with residential density. The reason for the site selection is thus its small size of 63-78 m^2

coupled with its mostly single storey, horizontal type of development that I reckon will be interesting to investigate.

The Mekelakya Sefer is especially chosen from the 4 other similar project because of the flowing reasons

- it is solely made up of small plots while others have some medium and large plots in them
- its housing delivery scheme is unique in that it involves a large number of low income households from the armed force personnel or the other residents

3.5. Sources and Method of data collection

This research will have qualitative and quantitative nature hence will follow the combination of case study, survey and archive analysis method. As stated above the objective of this research is to study residential density and its relation to housing transformation. Data will be collected from 4 basic sources.

Table 3 Sources of Data fro research

1	Interviews with key informants and government officials	PRIMARY SOURCE
2	Survey data from random samples using closed and structured questionnaire	PRIMARY SOURCE
3	Case study data from purposely selected samples using semi structured questionnaire	PRIMARY SOURCE
4	Cadaster maps from sub city up to 2019 and Google earth maps of different timeline updated by first hand site observation	SECONDARY SOURCE

To this end, qualitative data about the history and nature of the housing will be gathered from key informants and published and unpublished work of the sub city administration. This data along with first hand site observation will be used to draw random sample survey.

Density data can be collected using GIS, google earth and other Cadaster maps available from 2002 to calculate the residential density of initial stage and data from survey and current cadaster map will be used to calculate current residential density.

In order to get to increase the accuracy of findings and minimize the use inferential statistics, area and density calculation are conducted on the whole of 5.5 hectare site but supplemented with data from the survey when required.

Primary Data collection will be acquired from survey in the form of questionnaire and in-depth study of representative case study from different typology to be identified.

Key informants such as residents that were and still are the residents of the area from its beginning in 2002 will be interviewed.

Secondary Data is from Woreda 7 Administration as well as the Kolfe Keranio Sub city. Other Published and Unpublished literature from regional and federal urban planning institutes in the country will also be used.

3.6. Sampling methods

Currently, the total sample size (housing unit) is 419. (Zegeye *et al.*, 2009) acknowledges that systematic sampling is a valid method of sampling in quantitative studies. After initial observation, only one strata of housing units were identified with the variable of housing transformation (all houses have transformed regardless of their type or size). Therefore, the systematic sampling technique was used. The samples are selected by drawing a 45^0 inclined grid lines enclosing roughly $500m^2$ area which is 10% of the total area (see figure 1). The intersection of these grid lines on a plot will automatically select that housing unit for survey.

The case study is purposely selected to represent the different typologies in the site in-depth. Therefore, at least 2 of each type was selected.

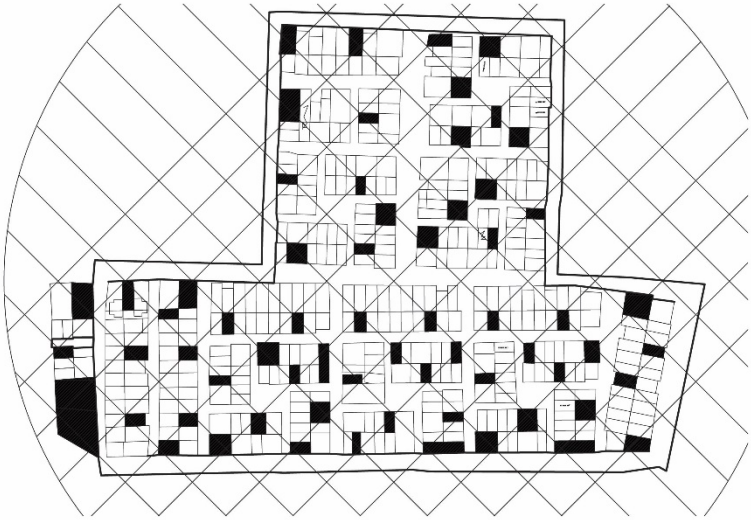


Figure 7 Random sample selection

3.7. Data analysis methods

As it is both qualitative and quantitative research, data will be analyzed using different analyses tools. These include

a. Descriptive statistics- tables, charts and graphs to quantify density and relate it standards
b. Maps &Illustrations- figure ground imaging, site plans and 3D drawings to show the process of transformation
c. Comparative study- Before and after juxtaposing, timeline mappings and descriptive Statistics to show the impact of transformation on density

4. CHAPTER FOUR - CONTEXTUAL REVIEW

4.1. Historical background of private housing in Addis Ababa

The history of Addis Ababa as a city began in the later years of the nineteenth century when it was selected for military and fortification purposes in the uphill mountain of 'Entoto'. Addis Ababa was founded in 1886. The palace of the emperor dates from the year 1891. By the beginning of the twentieth century the emperor of Ethiopia along with his comrades and servants have settled in the palace found at downhill. Soon after, Land was allocated to high ranking officials, foreign bodies and traders. People close to the emperor and high ranking officials built their houses in nearby location surrounded by soldier's quarters. Peasants and servants then began to settle in huts around the palace. These later became "sefers". Land tenure was introduced in 1907 and the insecure status of many properties was changed to private(MihretuTesfaye, 2005).

For the most part of the twentieth century land and housing in Ethiopia were controlled by a select few individuals and groups who owned and tightly controlled land and housing development. Housing supply was led by the landowning elite with less than one per cent of the population owning more than 70 per cent of the arable land, on which 80 per cent of the peasants were tenants. Low-income households had little option but to rent housing and this was done outside of any formal control or planning system(UNHABITAT, 2011).

The feudal political system during the imperial rule of Haile Selassie I did little to increase the urban housing supply for the low income. 60% of urban housing was predominately under the control of land lords. And due to the limited choices of shelter the urban poor lived as tenants by renting dwelling units from the landlords (MihretuTesfaye, 2005).

In 1974, the overthrow of Haile Selassie brought the communist regime of 'Derg' whose policy on land and housing was governed by central market system. In July 1975, Proclamation No. 47: 'Government Ownership of Urban Lands and Extra Houses' was announced. The regime nationalized all urban land in an effort to force a fairer distribution of wealth across the country. Later on 'Derg' loosened its control of housing supply by allowing private house owners and tenants of public premises to sell and exchange their houses. Proclamation No. 292 of 1986 specified that "residential buildings could be produced only by state enterprises, municipal governments, housing cooperatives and individuals who build dwellings for their personal consumption". This move allowed some

to build their own houses but effectively removed large scale private developers from housing supply (UNHABITAT, 2011). Centrally administrated construction of houses through cooperative, aided self-help, low-cost and site and service housing schemes were promoted in this period and different financial mechanisms were implemented to subsidize housing. However, it didn't address the poor as 60% poor didn't have work in governmental offices and/or had an income below a certain limit and had absolutely no chance of being incorporated in the subsidized housing market and standards of services. The housing scheme opened ways to the indirect material flow from the poor to the well-off, because of the high construction and administration costs and restrictive credit systems are accessible for the urban poor(Shiferaw, 1998).

The monopoly of urban land and the accumulated neglect of the poor in housing supply by the imperial and communist regimes in Ethiopia led to extreme shortage of housing and deterioration of existing structures. According to Shiferaw (1998), people began to look for their own sporadic means of improving their housing conditions. Thus, Private initiative became the dominant form of housing provision and maintenance of existing housing stocks for both owner occupancy as well as government-owned ones.

After the overthrow of the 'Derg' by the EPRDF in 1991 to date, Ethiopia has been undergoing market-orientated reforms. The government maintained public ownership of land but introduced policy allowing ownership of property including housing without limits. At first it had assumed that the housing market alone would meet the demand for affordable housing of the low-income population later on many changes were introduced in the housing delivery system(MihretuTesfaye, 2005). Apart from the shift in housing economic policies, the government has constructed or facilitated the construction of housing under different housing like co-operatives, public rental, Replacement '*mirete*' , private real-estate and condominiums in an effort to reduce housing backlog and make people home owners.

Table 4 Houses constructed in Addis Ababa from 1996 – 2003 ,source *(UNHABITAT, 2011)*

Housing supplier	No. of houses	Percentage share
Public	7,409	8.4
Cooperatives	24,820	28.2
Individuals (formal)	22,225	25.3
Real estate developers	3,520	4.0
Informal sector	30,000	34.1
Total	87,976	100

This issue of privatization of housing was a global phenomenon at the time, adopted more or less enthusiastically in one form or another in many different countries, for a variety of reasons. In some countries it has been the defining narrative of housing over the last 20 or 30 years. Each country started from a different position and proceeded in its own way, at its own pace (Smith *et al.*, 2012). According to Smith *et al.* (2012), market forces and private property rights were never completely removed from housing in socialist countries, but neither were they unrestrained in capitalist countries that were committed to the private ownership of property.

In 1994 the urban land lease legislation was issued which stated that land less than 75 square meters could be given free of lease charge, 75-175 square meters could be leased out at 0.50 birr per square meter per year and land above 175 square meters could be acquired by public tender rate payable over a 99 year period(EliasYitbarek, 2008)see Table 5. This created small plot residential units for some and according to MihertuTesfaye (2005), favored some with the financial means to compete for land especially people who are willing to pay the highest lease value for inner city land. The current structural plan of 2017 has allowed for conditional “privatization”; transfer to sitting tenants under the condition that ownership will only be transferred when the houses are improved to a minimum level of standard (AACPPO, 2017).

Table 5 Minimum and maximum allowable plot sizes, source(MihretuTesfaye, 2005)

	Plot size (m2)		Floor area (m2)	
	Minimum	Maximum	Minimum	Maximum
Pre 1986	500	-	22	180
1986-1989	108	250	17	70
1990-1991	144	650	14	180
Current	73	175	56	175

Consequently, four major ways of acquiring land in the city was adopted. These are by lease from the government, government to private free of charge, through purchases from other holders of title deeds, and banks and other institutions to private of mortgage land with property on it (MihretuTesfaye, 2005). Other than that, residents of the city are either tenants of the government and private landlords or are squatters in extra-legal settlements. The majority of the low and middle income houses had income constraints and a lack of proper policies from the government. This did not encourage residents to construct their own houses. For these reasons low and middle income households are the major market for rental housing (ibid)

Table 6 tenure types in Addis Ababa in 2000, source (MihretuTesfaye, 2005)

Tenure type	Number of houses	Percent of houses
Owner occupied	128,997	34.42
Rented from kebele	142,095	37.92
Rented from public housing agency	9,277	2.48
Rented from other organizations	1,272	0.34
Rented from private households	61,256	6.35
Paying difference rent	957	0.26
Rent free	29,464	7.86
Not stated	1 ,424	0.38

UNHABITAT (2011) characterized post-1991 housing of Addis Ababa as

1. private housing sector that has not been sufficiently engaged in housing supply,
2. a government owned and private rental dominant low income housing,
3. an existing housing stock is of a very low quality in need of renewal and/or upgrading
4. Informal unplanned housing proliferated as a result of high urbanization, and
5. Limited housing supply,
6. The limited affordability of formal housing.

4.2. The SDGs and the new structural plan of Addis Ababa

The Sustainable Development Goals is in the third year of implementation of the 2030 Agenda for Sustainable Development. Of the 17 goals outlined goal 11aims to make cities and human settlements inclusive, safe, resilient and sustainable. According to UNESA (2018), many cities around the world are facing acute challenges in managing rapid urbanization— from ensuring adequate housing and infrastructure to support growing

populations, to confronting the environmental impact of urban sprawl, to reducing vulnerability to disasters.

Ethiopia in line with its development policy is part of this agreement. In light of this, has launched 'The Addis Ababa Structure Plan' in 2017 commissioned by the Addis Ababa city Government plan commission to guide the city's development. The city previously had different master plans the most recent being the 2002 Addis Ababa Master plan. The Plan had comprised a statutory structure plan, an action oriented strategic development framework and a management reform component. The statutory structure plan had provided an overall framework for the spatial development of the city. The action oriented strategic development plans had prioritized six key urban issues to be implemented in five years (i.e. housing, urban road network and transport, manufacturing industries and large storage facilities, environment, and inner city renewal and upgrading); and proposed implementation mechanisms and financial investment requirements (AACPPO, 2017) . Nevertheless, it had failed to sufficiently elaborate implementation mechanisms (including institutional set-up and financial sources) to carry put those plans. But most importantly, it did not integrate its plan with those of neighboring administrative zones and municipalities therefore could not effectively guide the development of peri-urban areas or curb urban sprawl(AACPPO, 2017).

The 2017 structural plan is prepared to guide the development of the city for the coming ten years (2017-2027). The key ideas considered in the plan are the role of urban centers as engines for national economic growth that will contribute to the realization of sustainable urban development. Addis Ababa is the fourth most densely populated city in Africa following Lagos, Cairo and Kinshasa. Paradoxically, housing density in the city is much lower than what is found in some of these cities which is an indication of overcrowding. The plan recognizes that Addis Ababa needs to achieve economic, social, cultural and environmental objectives stipulated by Articles 89-92 of the FDRE Constitution. The plan also considers the city's development has already reached its administrative boundary and is left with very little vacant land for expansion. Moreover more than 90% of the houses in the capital are one storey buildings which indicates that land is not efficiently used. Residential density of Addis Ababa is about 29HU/ha and net population density in the built up area of the city is 125 people/ha (AACPPO, 2017). This

high population density coupled with the low residential density not only shows that Addis Ababa is densely populated but also shows the inadequate number of housing its dwellers are crowded into. Increasing the housing stock with limited expansion land called for vertical development. Therefore, with the ever-growing population and a high demand for housing, the commission resolved that there is no option but raise density in certain parts of the city (ibid).

Sivam and Karuppannan (2014) say that generally speaking higher density developments are presumed more sustainable. However, the link between density and aspects of sustainability remains a challenge for planning theory and practice. When simply put density is a measurement and design is a tool among tools to achieving sustainability in the built environment. For example, Squares and rectangular blocks are relatively more efficient than irregular and spread out blocks as they consume relatively more land and Density vary with the size and number and arrangement of dwellings in a block (ibid).

The Structural plan has 5 general guiding principles for Addis Ababa in line with its vision. They are;

- Compact and green development with good balance between open and green spaces and the built form;
- Mixity among income groups, housing typologies and land uses;
- Balanced growth through appropriate distribution of housing, economic activities and infrastructure;
- Efficient use of land in the city center, along mass transit lines (along LRT, BRT and future Metro lines) and renewal of slum neighborhoods; and
- Environmental sustainability through protection of the natural ecosystem.

4.3. Guidelines & Implementation strategies of residential density in Addis Ababa

Affordability, social mixity, compact development (vertical development rather than sprawl),improvement of quality of housing stock through upgrading and renewal, and linking employment creation efforts with housing programs are the general implementation directions for the provision on planned housing.

Compact and green development

The compact and green development is thought to be achieved by promoting the concept of mixed residence where there is an integration of different but compatible activities inside residential neighborhoods. This limits trips by encouraging working, living and getting services nearby. Densification depending on the type and location of housing within the city in addition to accommodating larger population in an area, is to attain social mixity and justify investment in mass transit towards such locations. The plan calls for mixed residence development in all parts of the city. The mixed residential density proportion applies both on the land use and at the building level. Accordingly there are 3 zones of mixed residence, High density mixed residence (HDMR), Medium density mixed residence (MDMR) and Low density mixed residence (LDMR) with a minimum stipulated gross density of 150Hu/Ha, 100Hu/Ha and 50 Hu/ha respectively.

The green development is regulated by the standard for the proportion of the built up area, green area and street networks adopted by the Structure Plan for mixed residential land use as 40%, 30% and 30% respectively. In such a way, the built up area is curbed to give way to open spaces and FAR for green infrastructure in the city is stipulated to be below 0.005. To encourage density, the proportion of the built-up area cannot be reduced, however, depending on the location and whether the area already has sufficient proportion of either green/open and street, this proportion can be reduced.

Table 7 Gross density regulation

Mixed Residence	Minimum Gross Density (housing units per hectare)	Location
High density mixed residence	150 hu/ha	Centres, corridor, high density mixed residence zones and commercial areas.
Medium density mixed residence	100 hu/ha	Mixed residence inside the inner ring road.
Low density mixed residence	50 hu/ha	Mixed residence outside the inner ring road.

Within the mixed residence land use, density varies from the center to periphery depending on location in relation to the transport system and width of street. This variation in density is also reflected in building height and FAR (the ratio of development in relation to the size of a plot), frontal setback and road width(AACPPO, 2017).

4.4. Description of study area; Kolfe Keranio sub city, Woreda 7

According to AACA (2014), Kolfe Keranio sub city is holding an area of 6348 hectare and is the fourth largest sub-city in Addis Ababa after Akaki Kality, Bole and Yeka area wise. But density wise, the sub city ranks 6th after AddisKetema, Arada,Lideta, Kirkos and Gulele sub-cities respectively which ,except Gulele, are located in the inner city of Addis.

Kolfe Keranio holds 16% of Addis Ababa's population and is divided into 15 Administrative woredas. The study area of this paper is located inside Woreda seven (7) in a section in what is administratively called 'Mender Sebat (7) and commonly referred to as "Mekelakya Sefer".

When it comes to Woreda 7, it has an area of 361 hectares which is 5.68% of the total Kolfe Keranio sub city. This makes it the 7th largest in the sub-city in terms of area coverage. Nevertheless, it is the second most densely populated Woreda from the 15

Woreda in the same sub-city after Woreda 2 AACA (2014). Gross residential density of Woreda 7 is calculated to be 24 HU/hectare.

According to AACPPO (2017), Woreda 7 is designated for LDMR (Low density mixed use) development with FAR ranging from 0.5 -3.5. Most of Woreda 7 falls on Zone 4 of building height regulation with a maximum allowable height of 35meters. However, the FAR for buildings facing a local street (street width less than 15m) is restricted to FAR 3. (See Figure 8)

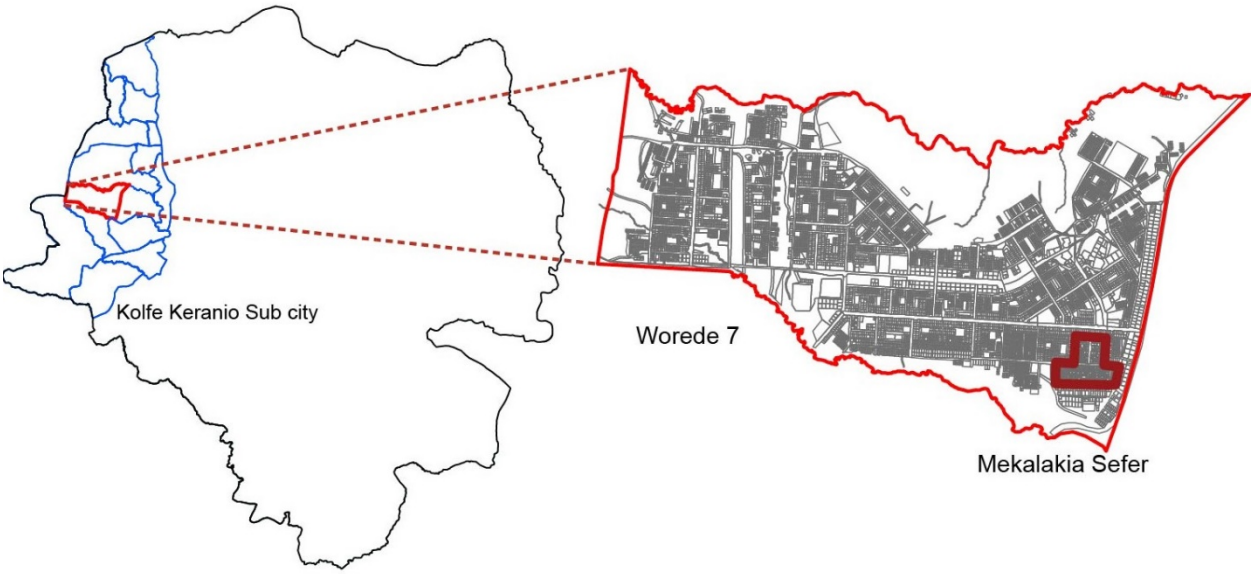


Figure 8, Location map of Mekelakya Sefer (adapted from Nortec

5. CHAPTER FIVE - DATA ANALYSIS AND INTERPRETATION

5.1. Introduction

The following section discusses the findings of data gathered through 5 basic means. These are interviews, Survey, case study, onsite observation and archive map analysis. Historical back ground data about the formation and current state of study area are mainly gathered through key informant and government official interviews. Qualitative data about the study area are mainly gathered through case study and 44 respondents' random survey. Quantitative data presented below will primary use the onsite observation and secondary map data but in parameters were the total population cannot be addressed logistically, it will be supplemented with the 44 random respondents' data.

5.2. History & Background of Mekelakya Sefer

The study site has an area of 5.5 hectare and has a relatively short history dating from 1999. Due to the lack of documented evidence, sources for the background and historical study are gathered from key informants and Woreda officials.

According to Key Informant 1 and Head of Housing development and finance in Kolfe Keranio Ato Fasil, the 504 housing unit was built by the Addis Ababa Housing Agency in collaboration with MUDC (Ministry of Urban development and Construction) somewhere between 1997-1999 .The Agency office was then based in the Addis Ababa Municipality in Piassa. The main aim was to house development related evictees *'yelemat teneshewoch'* and to resettle people who have lost their houses due to fire and other natural disasters. It was not an isolated project in fact it was a prototype development repeated in Woreda 14 in Kolfe Keranio as well as in Bole, Gulele and Akaki Kality Sub-cities. In some instances, NGOs like RED BARNA and concern Ethiopia was involved in the construction of these houses.

In the case of Mekelakya Sefer, according to all key informants, the site was built as a replacement site for people to be relocated to make way for the Sheraton Addis hotel. In 1999, after the completion of the project, the team of Sheraton consultant inspected the housing and deemed it unfit for their purpose and therefore abandoned it. At the time there was no running water, electricity or paved road and the nearest residential neighborhood with water and electricity was located in an adjacent Woreda 6. Three (3) years after the abandonment by the Sheraton hotel administration, the Defense Ministry

expressed interest in taking the houses and made a deal with the Addis Ababa housing agency to take custodianship of the houses and use them to house its lieutenants and low ranking soldiers by mode of rent. The rate was 30birr/room so rent at the time was 30, 45 and 60 birr per month according to the typology and number of rooms of the housing. The area was dubbed Mekelakya Sefer because the armed forces personnel were the first to occupy the site in 2002. There was still no electricity and water when the soldiers moved in, thus the defense ministry provided generators for lighting (not cooking) purposes and supplied trucks to transport potable water in tanks periodically.

Although it is commonly referred to as Mekelakya Sefer, not the whole of the site was used to house members of the armed forces. Generally speaking the houses were transferred to sitting tenants in one of the following ways.

1. The defense ministry internally distributed a total of 168 housing units to its employees at first by rent in 2002 then ownership through long term payment purchase in 2005. These houses constituted of 56 Q (Quadreplex) and 92 D (Duplex) and 20 R (Row) type of houses.
2. The Addis Ababa housing agency gave a quota of the R (Row) typology houses as replacement for families whose kebele houses were demolished the inner city like *Lideta* and *Kasanchis*. These tenants at the time were given the choice among the same type of houses that were constructed in *Bole, Gulele, Akaki Kality* and *Kolfe Keranio*, Woreda 14 sites. Families who chose the Mekelakya Sefer houses were given the houses at low rent in 2002/03 and then ownership through long term payment purchase.
3. The rest of the R (Row) type of houses were sold through an open tender to the highest bidder with an initial bid of 16,602.57 birr per square meter in 2005.

5.2.1. Change in tenure: from rent to ownership

The first modality of house acquisition of the houses was rental. It was after the 2005 election defeat of Addis Ababa, the ruling party decided to privatize the houses by way of sale to the sitting tenants. The remaining houses that were not occupied by methods (1) and (2) mentioned above were sold in an open tender to the highest bidder. Sitting tenants were given a chance to own their rented houses at the price of the initial bid of 16,602.57 birr in a 10 year long mortgage payment plan. Interested tenants were supposed to deposit a minimum of 10% of the 16,607.57birr and sign a mortgage contract with the Kolfe Keranio administration. Most have finished their payments and have title deeds on a free-hold property. The rest of the sold property were also issued title deeds with a free-hold property. The window of this privatization opportunity extended from 2005- 2008 after which the government revoked the proclamation of privatization. If during that period tenants were not interested in buying their houses, they were allowed to remain in their houses by continuing to pay rent. To this end, Mekelakya Sefer has 5 out of 504 governmental housing units that have not been privatized and pay rent to the Woreda. Then after, if properties were sold/transferred to a third party, the title deeds were automatically transferred from free hold to lease hold property. (See Figure 9)

Figure 9 Ownership map of 'Mekelakya Sefer'

5.2.2. Urban layout and Architectural design of original site

The study site is 5.5 hectares and is divided into smaller blocks each with its own open space. There are 3 typologies of housing. They are named Quadreplex house (Q) type, Duplex (D) and Row house(R) (See Table 8)

a. **Quadreplex house**- the plot size is 78.8 m^2 with 27 m^2 built up area comprising of 2 rooms and 1 toilet per family. Four houses are arranged back to back sharing 4

walls hence the name *quadreplex*. Although there is a separate toilet per plot, four houses share a single septic tank for cost reduction purposes. According to Key informant 1, the combined 4 houses' cost of construction was around 15,000 birr. There are 56 quadreplex houses in the site. (See Figure 10)

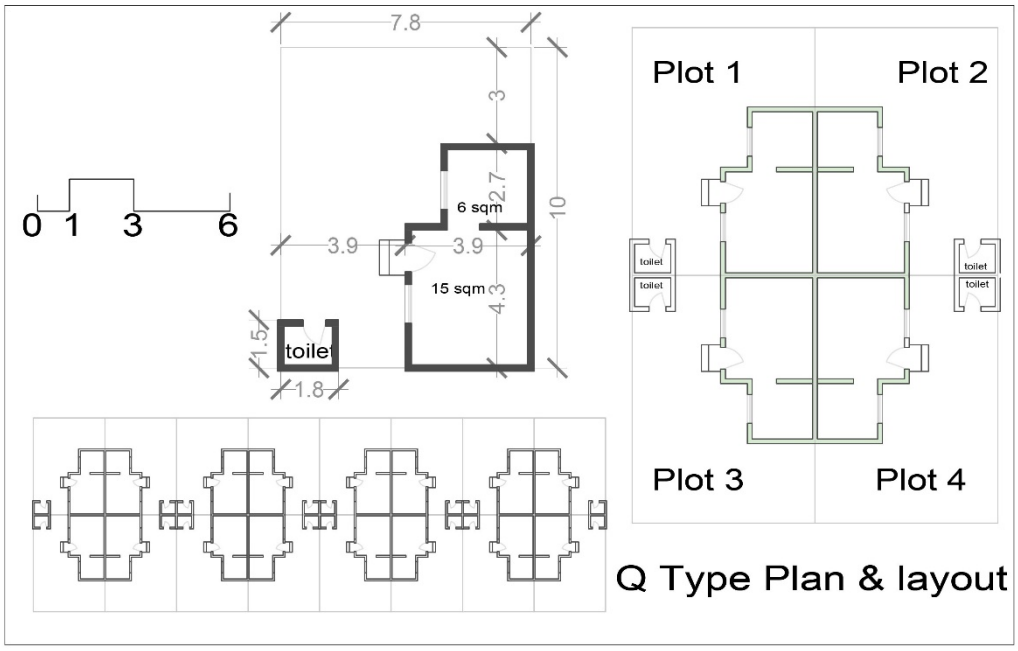


Figure 10, Q Type house plan and layout

b. **Duplex House-** the plot size is 73.5 m^2 with built up area of 30.5 m^2. It has 2 rooms and 1 toilet per house. Two houses are arranged back to back thus the name duplex. Similar to quadreplex 4 toilet share 1 septic tank at the back of each plot. There are 92 duplex houses in the site. (See Figure 11)

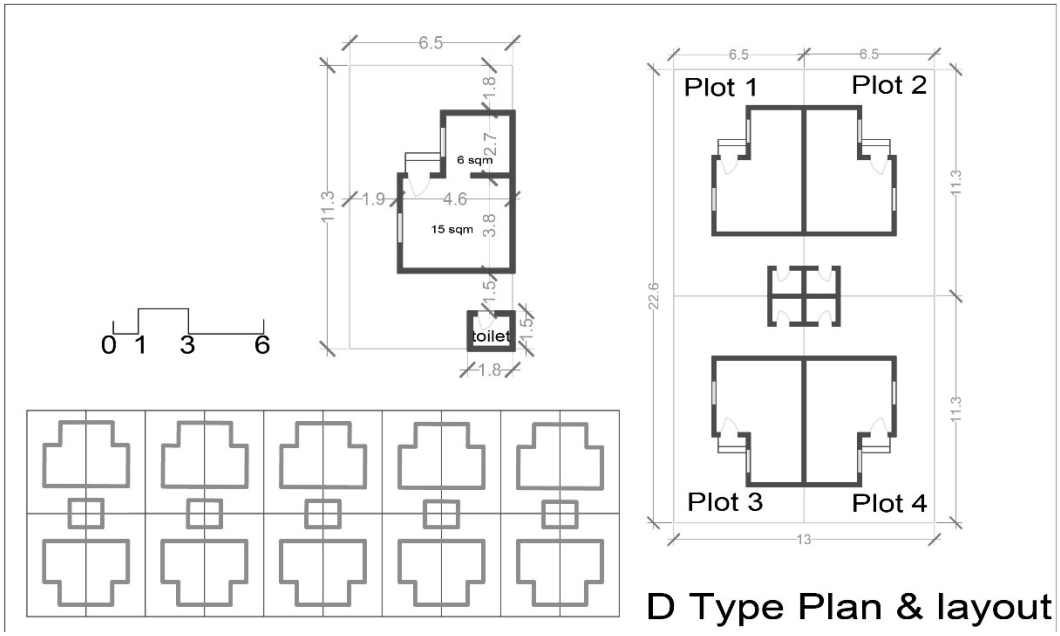


Figure 11, D type house plan and layout

c. **Row House-** these are 22.8 m^2 single room houses in a plot area of 63.5 m^2 arranged in rows around a courtyard /open space. They don't have individual toilets rather they have a common toilet building with 8-10 latrines in the middle of each open space for each block comprising of 52 houses. This type of house is the largest in number with 356 units arranged in 7 blocks. (See Figure 12)

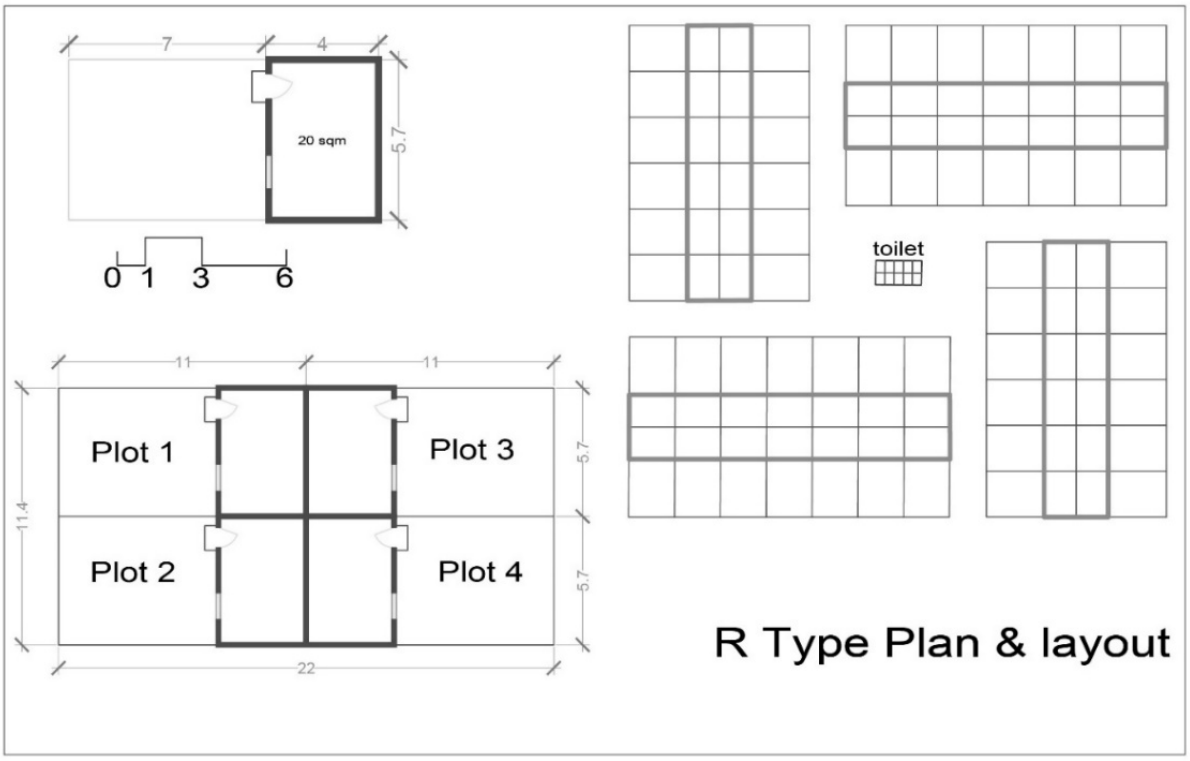


Figure 42, R type house, plan and layout

Hence, there were a total of 504 housing units in the site arranging in an area of 5.5 hectares in 2002. (See Figure 13)

Type	Plot size(m^2)	Street frontage	Number	Percent	Room No	Toilet type
Quadreplex	78.8	7.8 meter	56	11.4%	2	individual
Duplex	73.5	6.5 meter	92	18.3%	2	individual
Row	63.5	5.7 meter	356	70.3%	1	common
TOTAL	55,000		504	100		

Table 8 Original house typologies of Mekelakya Sefer

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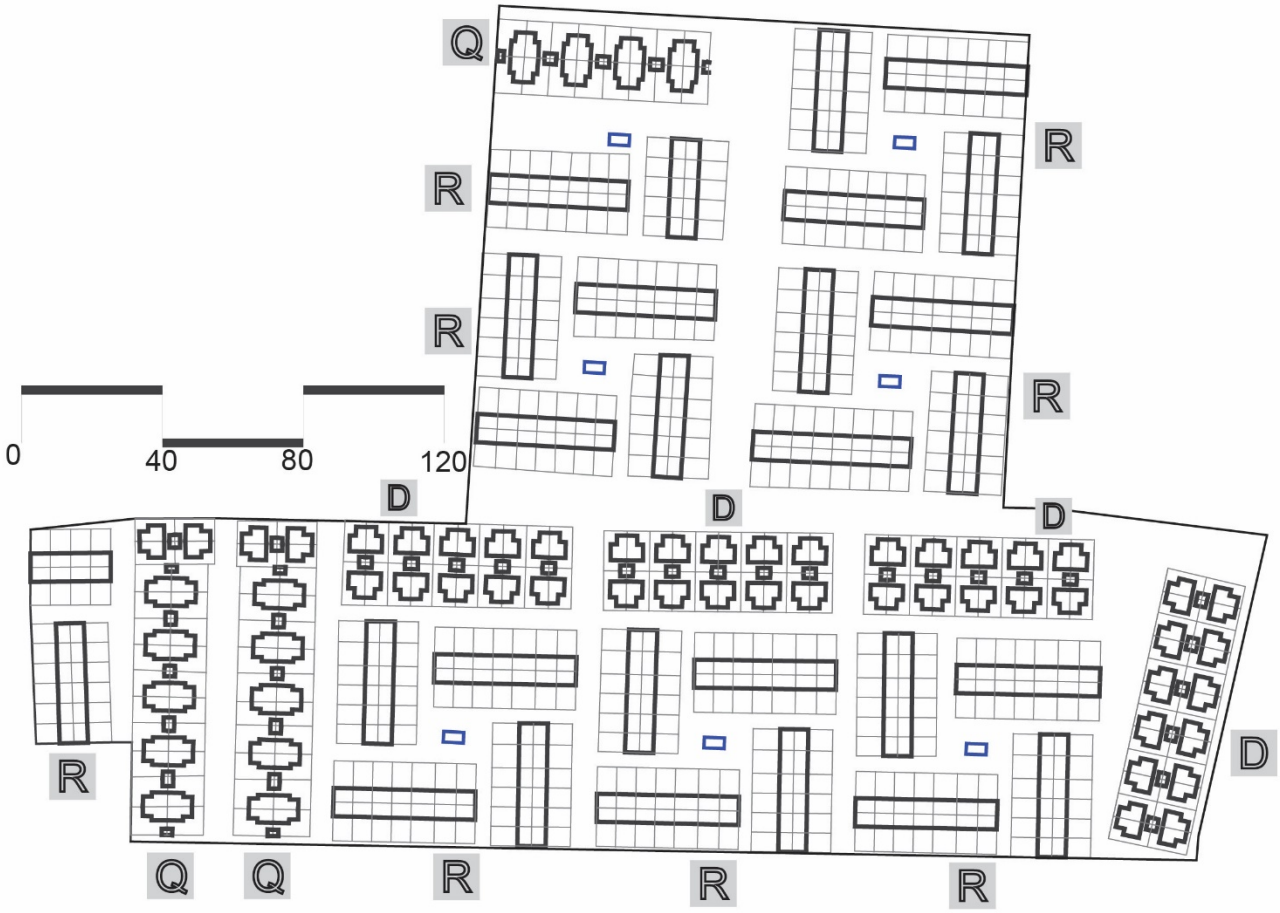


Figure 13, Original Urban layout of 'Mekelakya Sefer'

5.3. Demography and Housing

In order to better understand the residential density and transformation, it is advantageous to identify the type of dwellers and dwellings currently found in the neighborhood under study. To this end, this section discusses the nature of the current dwellers and dwellings in the site. To do so, data from the 44 respondents will be used.

HOUSEHOLD HEAD AGE and INCOME

The age of the housing itself is 20 years. The 81.7% age of the Household head is below 50 years old and 75% of respondents' source of income is private. (See Table 9 and Chart

1)This is in spite that the site was originally given to soldiers in the armed forces and Kebele house tenants.

Chart 1 Age of Household head

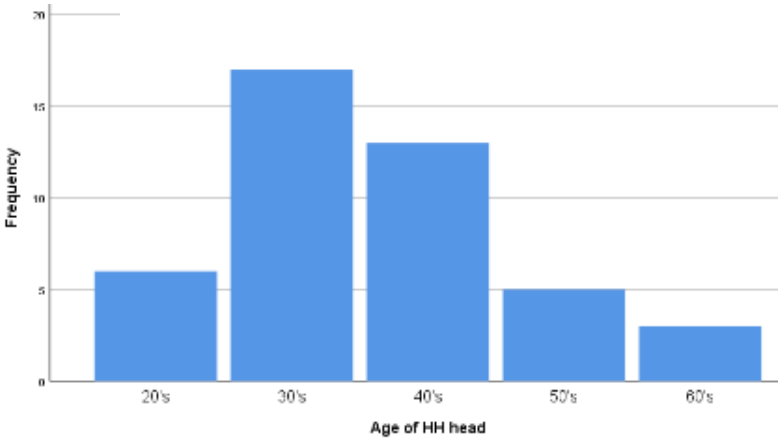


Table 9 Main Source of Family income

	Frequency	Percent
Government	6	13.6%
Private	33	75.0%
remittance & pension	1	2.3%
Renting House	4	9.1%
Total	44	100.0

HOUSING ACQUISTION & TENURE

The random sample of comprises of 6 quadreplex type, 10 Duplex type and 28 Row type of housing typology. This is nearly the same proportion of housing typology as found in the site.

There was a major demography change between the original occupants and the current. Evidence of this can be observed when we see the mode of tenure and mode of housing acquisition (See Table 10 and Table 11). Although the majority of the dwellers are owners (72.7%) and the rest 27.3% tenants, they are not the first hand buyers who bought the house straight from the government. Rather 70.5% current owners have purchased or repurchased these houses either from the lieutenants or from the people who bought them. Evidence for this is that the title deeds shift from free-hold to leasehold when it is sold and the same 70.5% of owners have a leasehold property.

House acquisition	Frequency	Percent
Gov. Merete, rent	9	20.5%
Lease	4	9.1%
Purchase from owner	31	70.5%
Total	44	100.0

Table 10 Mode of housing acquisition

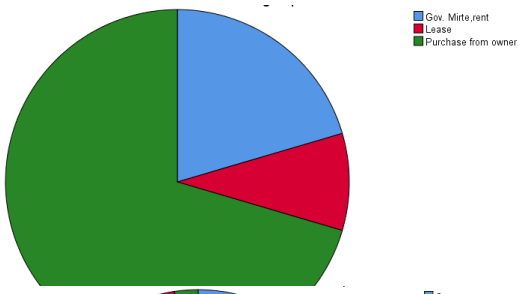
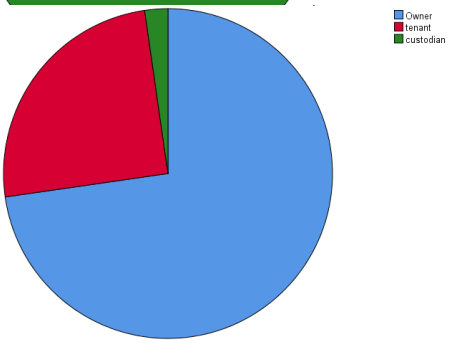


Table 11 Mode of tenure

Tenure	Frequency	Percent
Owner	32	72.7%
tenant	11	25.0%
custodian	1	2.3%
Total	44	100.0



When it comes to household size of the respondents, the average household size is 5.57 person per household on the main house. But since there is a culture of renting out extra rooms, there could be more than one household in a single housing unit. The average household size of rented out tenants is 1.43 person per housing unit.

5.4. Residential density

In the span of 16 years between 2002 and 2019, the study site has undergone many changes in its residential density. To systematically measure these changes the following measurement tools will be used.

a. Housing unit density (HU/Hec)
b. Household density (HH/Hec)
c. FAR & BAR
d. Perceived density

a. HOUSING UNIT DENSITY

In 2002, there were 504 housing units in a net area of 5.5 hectares and a gross area of 6.7 hectares. Thus the net density was 92HU/Hec and gross density of 75HU/Hec. Even then, this is well above 50HU/Hec minimum the regulation requires now.

After the privatization of the units to individuals in 2005, two major events shaped the residential (Housing unit) density. They are

- the joint lease of two or more parcels (See)and
- The addition/ inclusion of external plot area into existing parcels in the process known as area inclusion *'makatet'*. (See figure 17 & 18 on page 69)

In such a process of *'makatet'*, owners are allowed to claim neighboring unclaimed plot into their own provided that the street frontage of the claimed land is less than 6 meters and their existing plot will not be greater than 500sqm after inclusion. The effect of *'makatet'* will be measured in section (c) on the BAR and FAR.

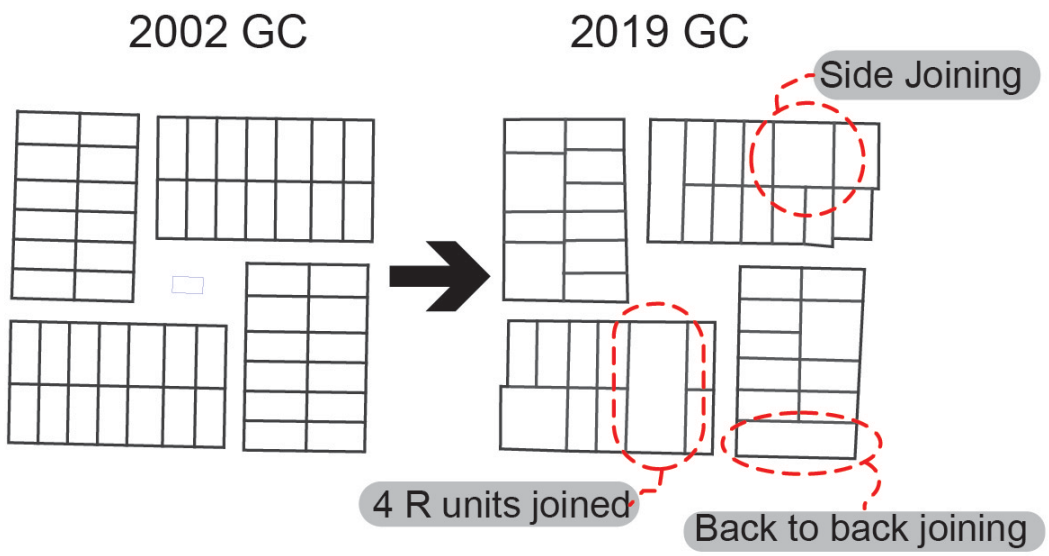


Figure64, Joint plots of 'Mekelakya Sefer' (adapted from Nortec)

Joint plot & Housing unit density - The overall number of housing unit has decreased from 504 units to 419 units because of joining of plots. The minimum and maximum number of joint plot sale is 2 and 9 respectively. Thus the minimum and maximum plot area in the site become 63.5 m^2 and 571 m^2 respectively. The Housing unit density decreased from 92HU/Hec to 76HU/Hec as a result. (See Table 12)

	Quadreplex (Q)	Duplex (D)	Row (R)	Total	Net density	density required by regulation
Number in 2002	56	92	356	504	92HU/Hec	Not specified

Table 12, Housing unit in Mekelakya Sefer

Number in 2019	56	92	271	419	76 HU/Hec	50HU-100HU/Hec

If we see the actual number of typology decrease, we see that the R (row) typology is the most affected by the joint plot sale. There are a few reasons to explain how this could have happened.

I. The Q and D type of houses were originally given to the armed forced personnel thus when the move to privatize was allowed, each household bought his own plot and could not get access or money to buy a neighboring one. This could be explained by the fact source of income of families was government salary.(ECONOMIC REASON)

II. Many of R type of houses were leased off to the highest bidder and bidders were allowed to compete for more than one plot. Thus bidders owned two or more adjacent plot in a single title deed upon winning the bid. (ECONOMIC REASON)

III. The R type is the smallest of all the plots thus it is possible that when new buyers become interested to own a house in that area, would want to merge them to get a larger plot. Evidence for this is that 73.3% of people who transformed their house stated because the house was too small for 1 family of 5 to live in. (SOCIAL REASON).

This in-turn is supported by the demography change brought about by the sale of housing units from the soldiers or low income residents to an upper social class who afforded to buy houses at 50,000birr/m^2 i.e. the highest bid at the time in 2005.

b. HOUSEHOLD DENSITY

Given that in 2002, one housing unit or parcel was given to 1 household, we would have the same number of HU and HH density. But throughout the years, activities such as room rent or '*debal*' system has increased the Household density. Lack of documented data limits us to know the extent of the 'debal'. Key informants told us during the interview that between 2002-2005 , when the houses were still under the government, '*debals*' were assigned into the Q and D type of houses as these houses were two rooms each. This was with the criteria that the tenants were single/unmarried or the sitting tenant

requested a 'debal' because he could not afford the 60 and 45 birr rent for Q and D houses respectively. But in 2005 when tenants began to buy their houses from the government, there was only a single owner for each housing unit. Hence, household density is assumed to be 92 HH/Hec.

Renting of extra rooms is a phenomena that has been practiced in this neighborhood despite its small plot houses (See Table 13). Out of 44 respondents 28 housing units (63.6%) said they don't rent out extra rooms and 16 (36.4%) of housing units reported to have extra rooms for house rent purposes. These 16 housing unit hold 52 households all together. 16 of them are the owners themselves and 36 households are tenants. This data signifies that the 16 housing units have almost twice as much households than the 28 housing units that don't rent out rooms. Given this data, it is estimated that household density has increased from 92HH/Hec to 138HH/Hec from 2002 until 2019.

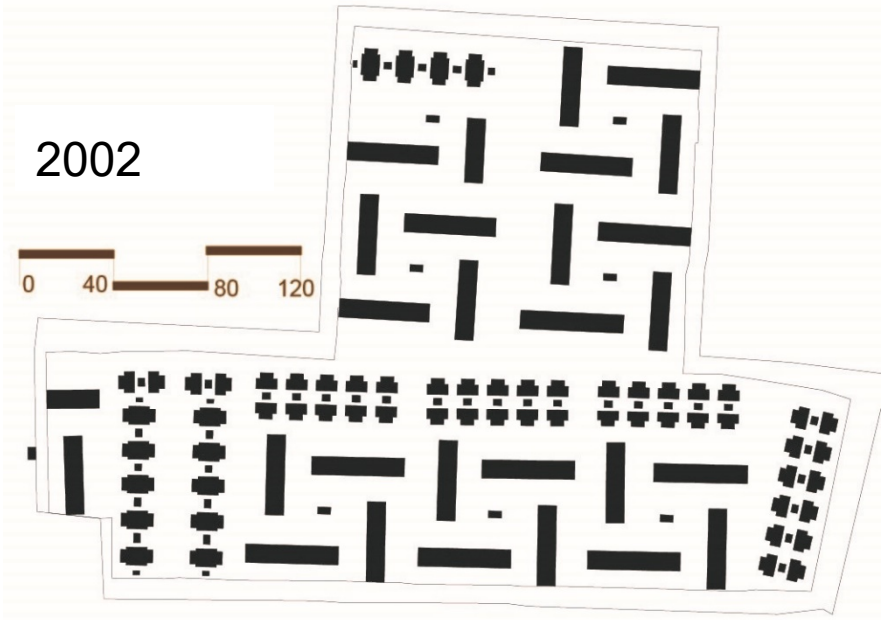
House rent	Frequency	HH/Hu	Percent	Cumulative Percent	House Unit density (HU/Hec)	Household density (HH/Hec)
No	28	1	63.6%	63.6%	76 HU/Hec	138HH/Hec
Yes	4	2	9.1%	36.4%		
Yes	7	3	15.9%			
Yes	3	4	6.8%			
Yes	1	5	2.3%			
Yes	1	6	2.3%			
Total	44	100.0	100.0			

Table 13, Household number in Housing Unit in 2019.

c. FLOOR AREA RATIO (FAR) & BUILT UP RATIO (BAR)

The extensive building, extending and demolishing process has visibly increased the built up area of the site. (See Figure 15 and Figure 21 on page 78) The main factors for the change in built area are

i. The building of new structure within parcels (transformation)
ii. Enlargement of many parcels by the process of 'Makatet'



The original site had centrally planned and executed regular patterns. The delineation of street, open space and parcel was formed.

Within the planned boundary of parcel, irregular extensions have emerged from the original structures. One can see that the underlying original structures have guided the transformation process.

Figure 85, Building morphology of 'Mekelakya Sefer' in 2002 and 2019 (adapted from GIS cadaster 2017)

The Mekelakya Sefer site have shown dramatic increase in its BAR (Built-up Ratio) and FAR (Floor area ratio) of the area. This is undoubtedly because of the extensive transformation work the site has undergone. Figure 16 Below shows the transformation on a typology basis. In the map we can see that the housing transformation was not limited to any typology or location within the neighborhood. Thus, one can see that the Q,

D and R houses closer to the main road as well as the houses in front of the open space (limited vehicular access) or far from the main road transformed to a similar extent.

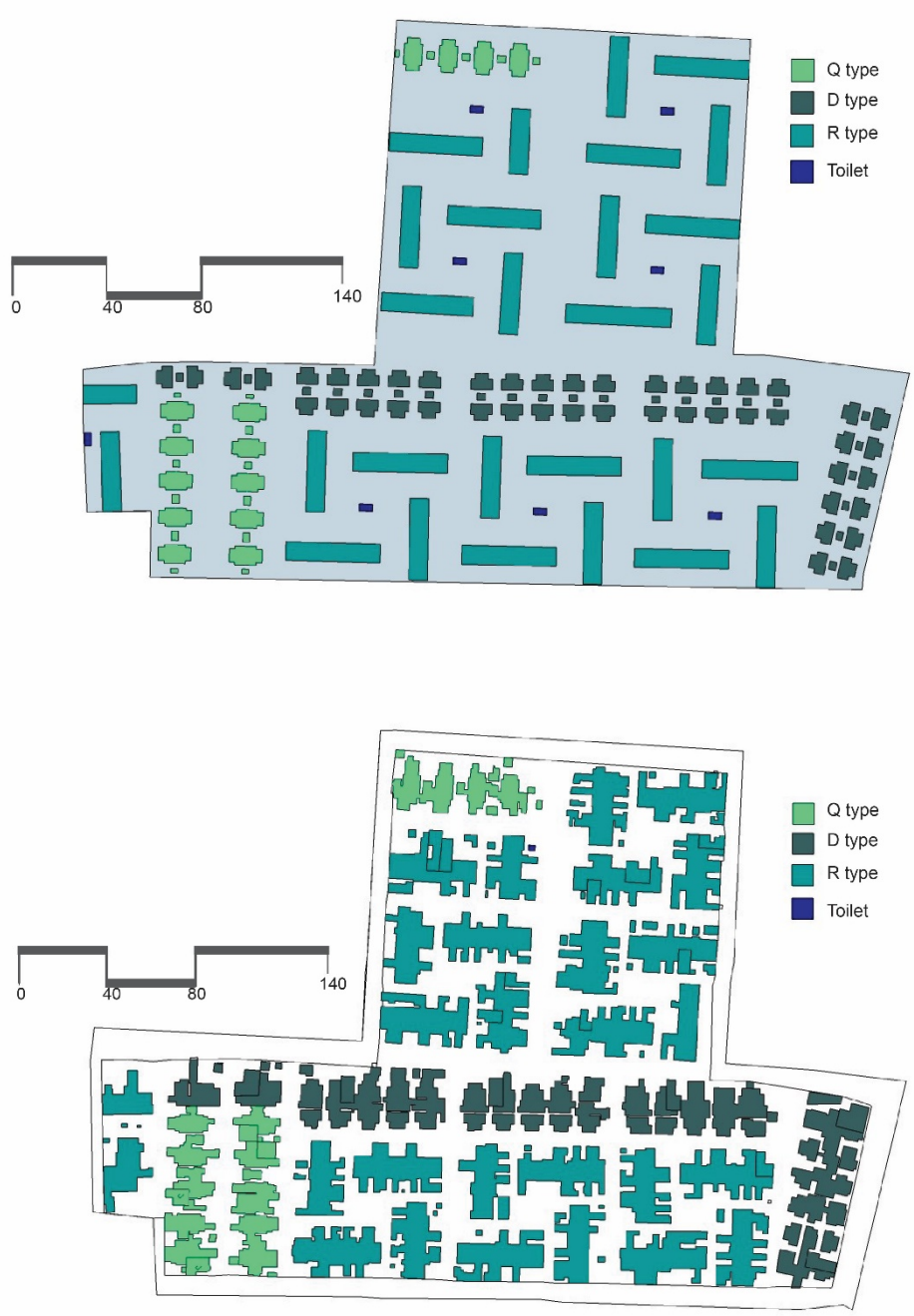


Figure 16, Transformation of different typologies 2002 -2019 (adapted from GIS cadaster 2017)

In 2002, only 1.27 hectare of the total 5.5 hectare was built upon. This is 23 % of the total area. The rest 77% (4.23 Hec) was left for individual compound, road and open spaces. Similarly, since all the development is one storey, the FAR on the site level is 0.23. On parcel level, Q houses had 33%, D type had 41.4% and R type had 35.9% BAR of their respective plot sizes. The FAR on a parcel level is higher since it is exclusive of roads and open spaces with Q houses having 0.34, D type having 0.42 and R type having 0.36.

In 2019, the overall built up area has increased to 44.1% because of the doubling of built area from 1.27 to 2.4 Hec. The FAR of the site more than doubled from 0.23 to 0.5. This is because of the aggregate effect of many horizontal transformation and a few vertical once. The vertical transformation (see map) accounts only to 4.7% of the change in FAR with only 20 parcels transforming vertically from the 419 parcels understudy. The vertical transformation ranges from 2 – 5 storey, thus the maximum FAR on a parcel level is 4.06. (For detail see Table 14)

Table 14 BAR and FAR comparisons (2002-2019)

	2002					2019				
	Total Built-up area m^2	Total floor area(m^2)	Total site area ($m^{2)}$	BAR	FAR	Total Builtup area	Total floor area	Total site area	BAR	FAR
Q	1512	1512	4570	33%	0.33	2983	3380	5470	55%	0.61
D	2806	2806	6762	41.4%	0.41	5584	6790	8151	69%	0.83
R	8340	8340	22606	37%	0.37	15696	16857	23920	66%	0.7
total	12658	12658	33938	37.2%	0.37	24263	27027	37541	65%	0.72
Road & open space	138.16 (common toilets)	138.16	21061			17.27	17.27	17459		
Grand total	**12,796**	**12,796**	**55,000**	**23%**	**0.23**	**24,280**	**27044**	**55000**	**44%**	**0.49**

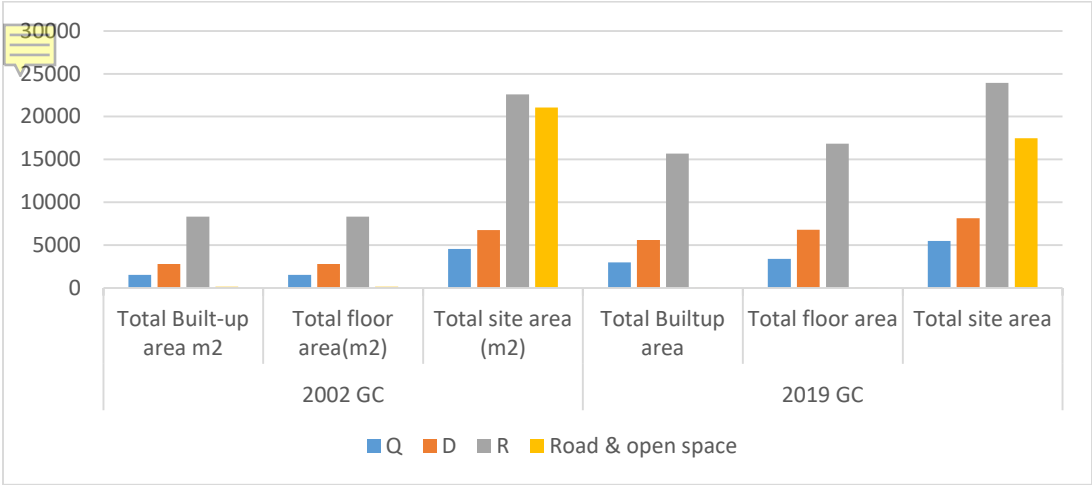


Chart 2 Built-up area comparison 2002-2019

Vertical transformation occurred only after 2009 on two plots independently but simultaneously. The first one was R type with a G+2 construction and the other was Q type with G+1 construction. Both transformations were done by new owners who had bought their plots from the original armed force owners. This is proof of the extensive transfer of plots to new owners by way of sale. Only 9 out 44 respondents remain of the soldiers who own the house and only 4 out of 44 are the original bid winners from the government. After 2009, a number of vertical transformations have taken place and currently 4 are still under construction. (See Figure 17 and 20)

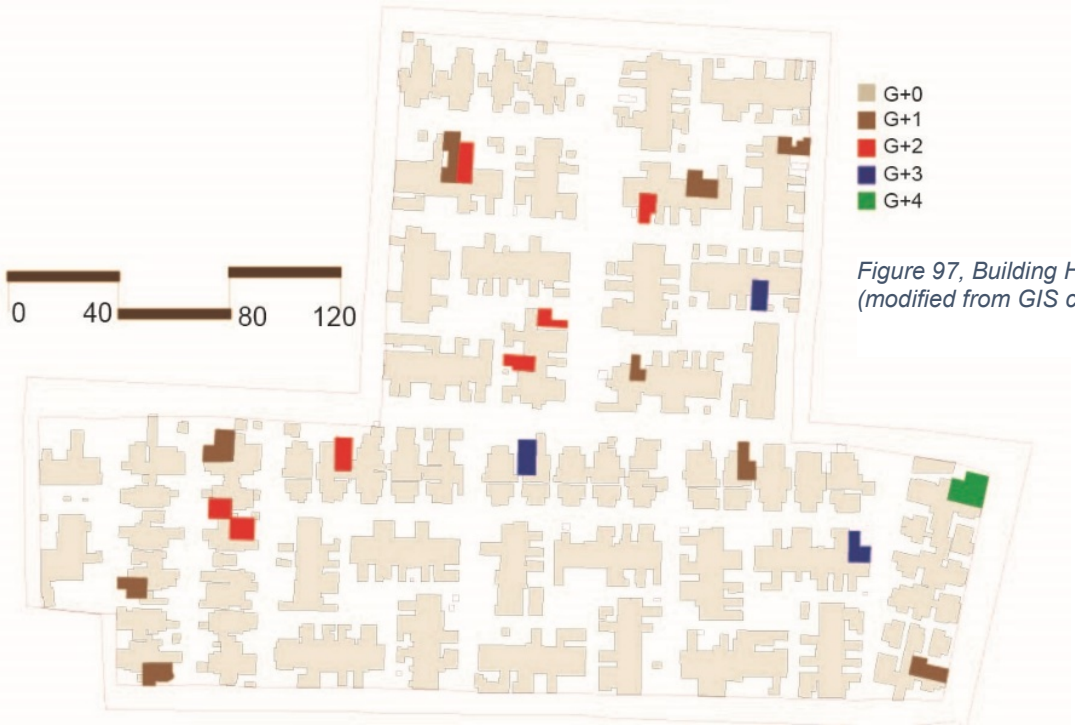


Figure 97, Building Height Map of Mekelakya Sefer (modified from GIS cadaster 2017

The process of 'Makatet' has contributed 8% increase in the overall parcel area which is a total of 2937 m^2 extra to the original parcel area in 2002. As a result, the combined parcel area of the 3 typologies together increased from 3.5 to 3.7 hectares. The Duplex type is the most to benefit from the '*Maketat*' process as this type of houses are located facing a wider street within the site.

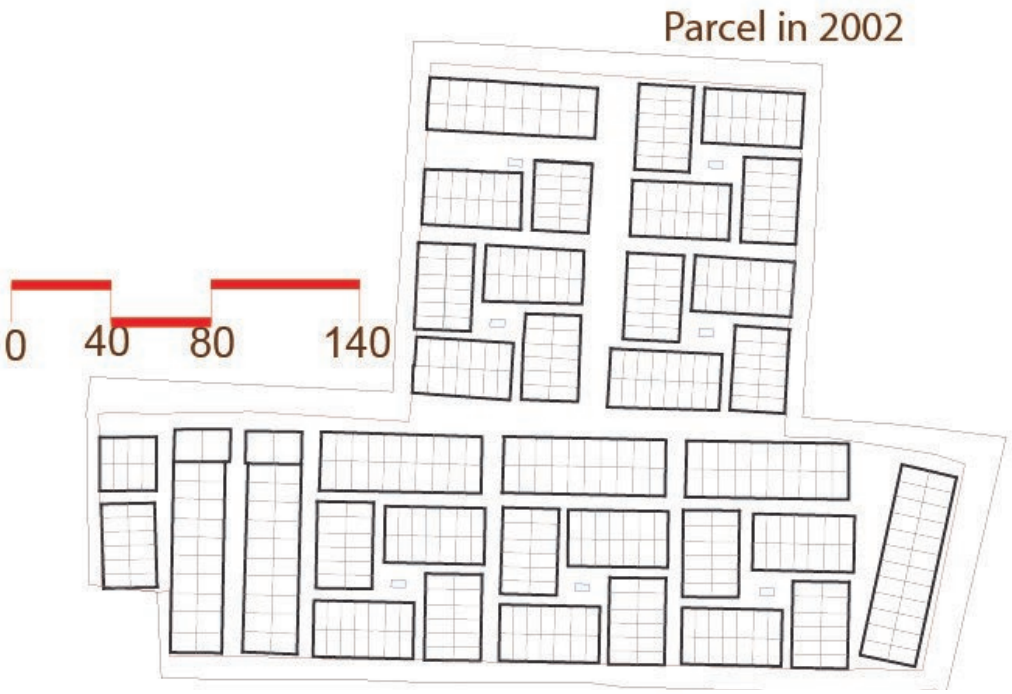


Figure 18, Parcel of 'Mekelakya Sefer' in 2002

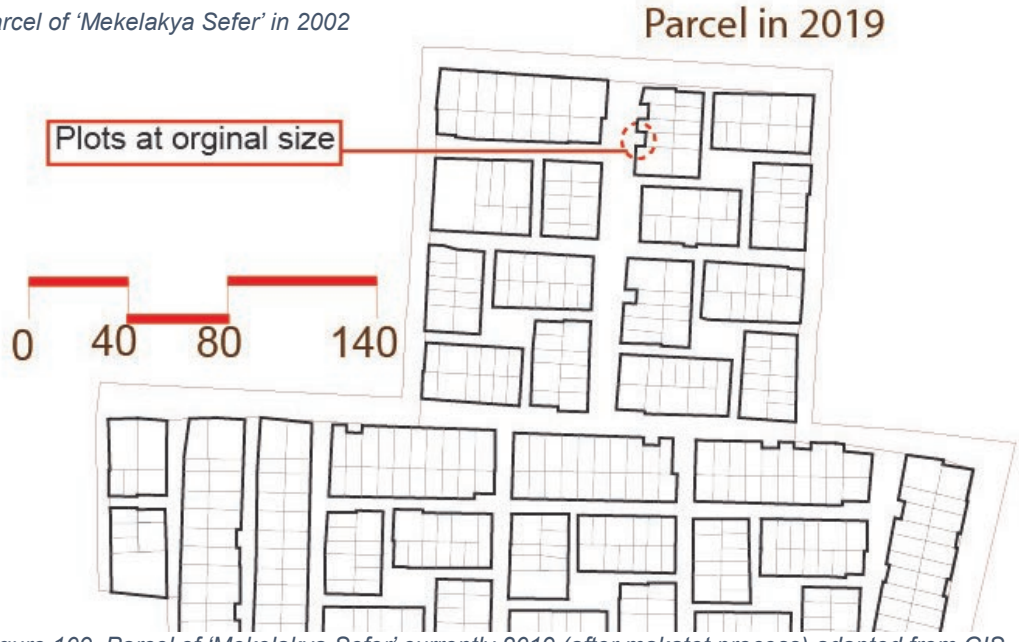


Figure 109, Parcel of 'Mekelakya Sefer' currently 2019 (after makatet process) adapted from GIS cadaster 2017)

Figure 2011, Multi-storey Building in the 'Mekelakya Sefer', A - G+0, B – G+2, C – G+3 residences

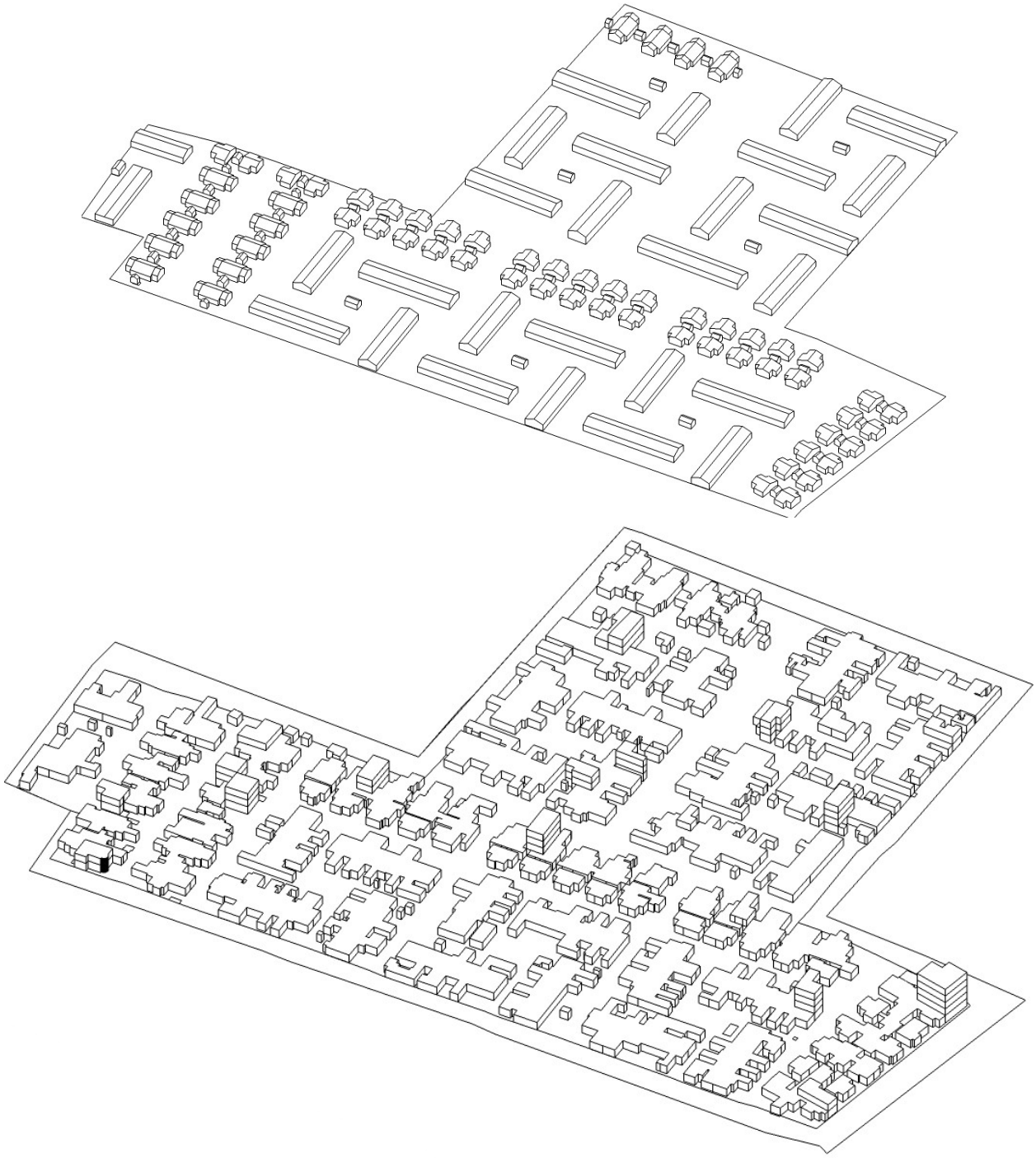


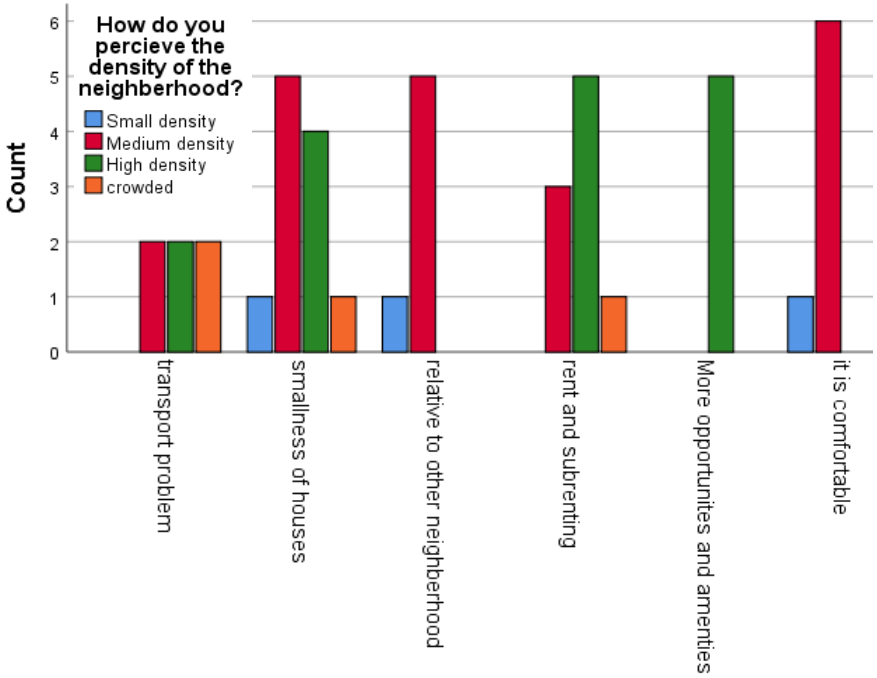
Figure 21, Before and after 3D images of 'Mekelakya Sefer'(own constructed from GIS base map of 2017)

d. PERCIEVED DENSITY

Rapoport (1975) says that perceived density and Affective density (crowding) deal with how density is 'read' or decoded by human beings. Any environment offers cues whereby people judge its nature, the potential for action which it offers, and the behavior appropriate to it. Since, there is no one accepted measure of density within countries, researchers often refer to density in relative terms, such as high or medium density, without specifying numbers.

Churchman (2009) adds perceived density and crowding are based on the principle that the same density can be perceived and evaluated in very different ways, by different people, under different circumstances. Thus, even though planners operate on the level of actual density, they must be cognizant of the fact that people experience and live in a multilevel situation that manifests itself in interactions between density and the perception and evaluation of density.

When asked about their perception of the site's density, 21 out of 44 respondents claimed that the site has medium density another 20 out of 44 said the site is highly dense or crowded. The main parameters of their judgment are



- the long transport queue (transport problem)
- the smallness of the plots
- the practice of renting and subletting
- the availability of affordable, varied type of housing
- the rich and established amenities and markets supply
- The comfort of living (quality of life)

Chart 3 reason behind perceived Density of site

Those who claimed that the site has small to medium density it is mainly because of the comfort they feel in their neighborhood. And those who felt that the site is highly dense said that the smallness of the houses and the practice of renting extra rooms coupled with the availability of urban services and amenities like diversified market, transport, employment in commercial units etc. has made the neighborhood sought-after by many residents. (See Chart 3)

It is clear from the above discussion that the residential density is impacted by the nature and level of the housing transformation that was undertaken in '*Mekelakya Sefer*. The next section will discuss the extent of the housing transformations and the effect that transformation had on the neighborhood.

5.5. Housing transformation; outputs and impacts

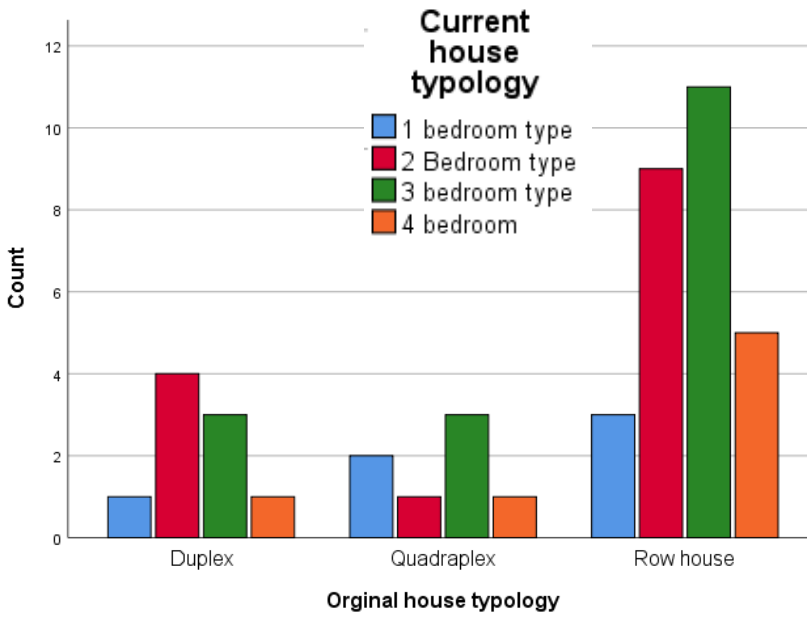
Housing transformation is the single most important factor for the change in residential density. 39 out of 44 housing units (88.6%) transformed their house from its original state. As a result, the original Quadreplex, Duplex and Row with 2 and 1 room units have evolved to become 1 to 4 bedroom type houses. (See Table 16)

	Frequency	Percent
Duplex	10	22.8
Quadreplex	6	13.6
Row house	28	63.6
Total	44	100.0

Table 15, Original house typology in 2002

Table 16, Current house typology in 2019

	Frequency	Percent
1 bedroom type	6	13.6
2 Bedroom type	14	31.8
3 bedroom type	17	38.6
4 bedroom type	7	15.9
Total	44	100.0



Reason behind transformation

Essayas (2000) broadly categorized reason of transformation into 4; to fulfill Economic, Cultural, Social and Environmental demands. To a certain extent, all of these reasons are applicable to the houses in Mekelakya Sefer area.

Dwellers can have more than one reason to transform. Thus, this study considers the underlying reason for the transformation. For example, erecting border fences or building toilets within the plot is considered a cultural demand for privacy. At the same time, digging separate septic tank or plastering and painting walls are considered Environmental reasons. Yet if that housing unit main intent is to add rooms to rent out but meanwhile build toilet or change building materials in the process, the reason of transformation is stated to be Economic.

The majority of the current housing units is 3 bedroom type (38.6%) and 2 bedrooms type (31.6%). This may be justified by the fact that 63.3% of the housing transformers transformed their house for social reasons such as lack of space or growing family size as an average household size of 5.57 in the survey data.

Another reason of transformation is economic, 36.6% of the transformers stated that they were economically motivated to transform their house. To this end, 20 out of 44 (41%) of the surveyed housing units have income generating activity in their parcels. 3 types of income generating activities are observed; House rent, Shop rent and Home based enterprise. Table 17 shows the type and frequency of commercial activities in the survey data.

	Frequency	Percent
House rent	14	31.8
Shop rent	2	4.5
Home Based enterprise	3	6.8
N/A (No economic activity)	25	56.8
Total	44	100.0

Table 17: Type of income generating activity

By far the most common form of income generation is house renting. This in turn increases the residential density. Activities such as shop rent or home based enterprise increase the mixity of the site from purely residential to mixed residential. 5 out of 44 (11.4%) of respondents are mixed use plot of commerce and residence.

When it comes to material and construction of transformed houses, the nature and quality of the construction has improved during transformation. In 2002, all of the houses and toilet blocks were constructed with rough unplastered & unpainted HCB walls. Doors and windows were made of wood planks. As shown in Table 18, in 2019, only 3 out of 44 surveyed units remain unplastered and unpainted, the rest have been either plastered and painted or simply painted.

Table 18: Building materials used in transformation

	Frequency	Percent
Plastered and painted HCB	31	70.5%
Unplastered & unpainted HCB wall	3	6.8%
Unplastered but painted Wall	3	6.8%
HCB and CIS composite	7	15.9%
Total	44	100

Moreover, 93% of transformers got construction permit when transforming. But 15% of these houses are extended their house using CIS walls which is not an allowed material for permit. This shows that the majority of constructions are legal and the construction materials valid. Except 2 units, 42 out of 44 units are in good condition.

Trends of transformation

With the help of google earth maps and Nortek line maps, common transformation trends and patterns of housing and neighborhood transformation are observed. Nevertheless, there is no specific order or timeline for these trends but every house unit transforms at their own pace and preference. Evidence for this claim can be seen where some 5 housing units have added rooms but have not built toilets of their own. Figure 22 shows the site in different years and points out some common patterns of transformation. The common stages of transformation observed are;-

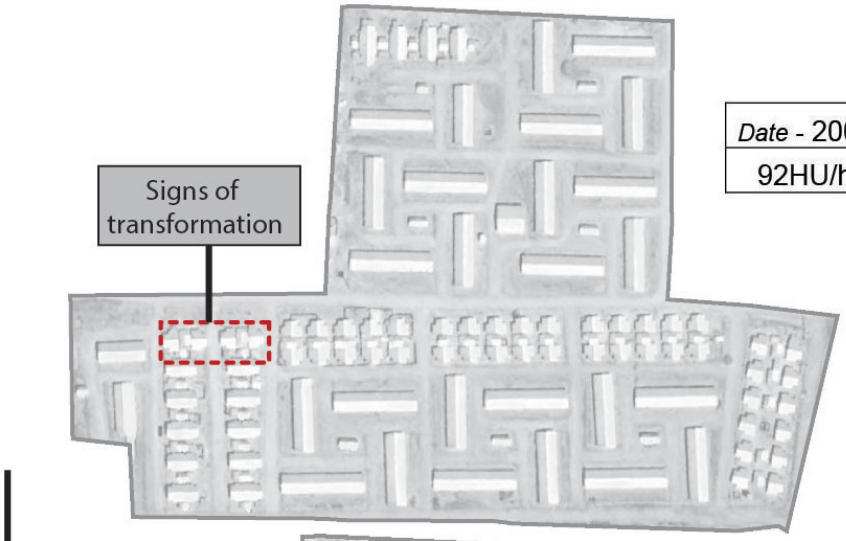
1st dwellers delineate their boundary by use of fence of CIS or other temporary materials

2nd horizontal extensions protruding from the existing original structure to increase number of rooms rather than area of room.

3rd Building of toilet within their boundary to increase privacy and avoid late night trips to the toilets outside of fenced boundary.

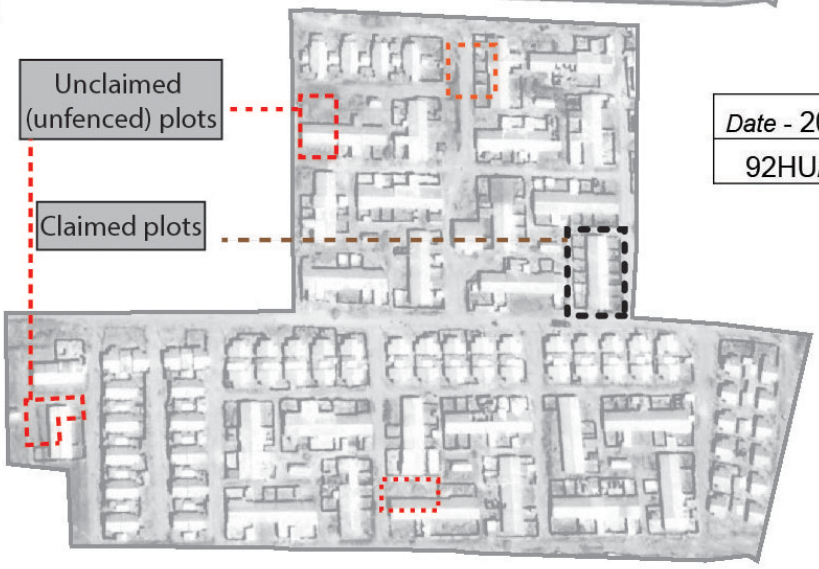
4th Tabula rasa sites for individual who chose to build new horizontal (G+0) or vertical structures in their plots

5th Joining of plots from sides and back to form larger plots to build on.



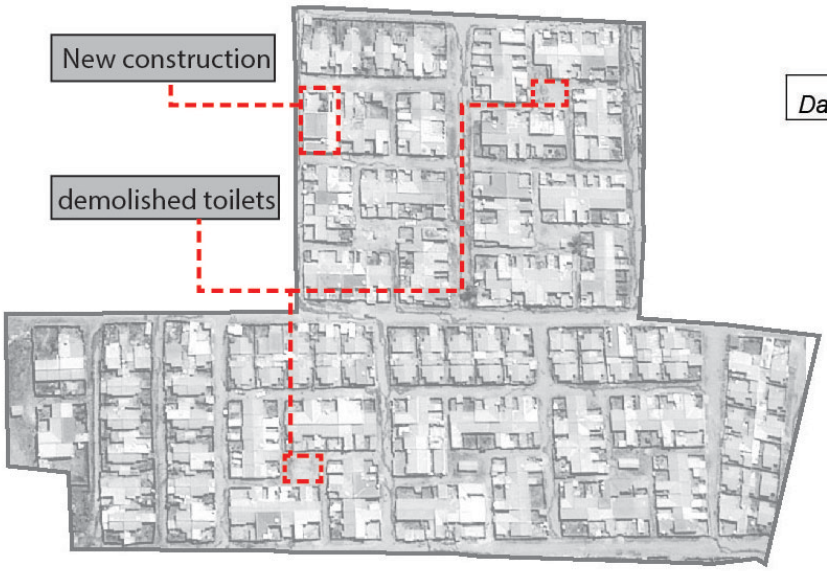
Date - 2002 GC	*Tenure* - Rent
92HU/hec	*FAR* – 0.23

-Original layout of site
-No fence or paved road
-The first signs of transformation



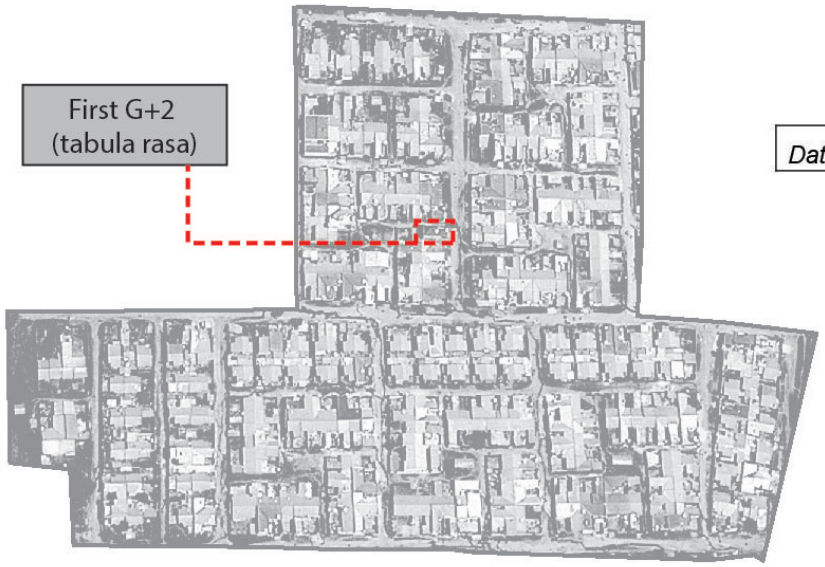
Date - 2004 GC	*Tenure* - Rent
92HU/hec	

- Territory definition by building fence around claimed plots is the first thing residents did. Empty (unclaimed) plots are devoid of fences
-Horizontal extensions are evident even before ownership
- All of the common toilet are still standing



Date - 2008 GC	*Tenure* - Owner

- 2 of the toilet buildings are demolished indicating all the 52 houses around the toilet built their own toilet within their plot. 2 other toilet blocks partially demolished(reduced in number of units
-The main asphalt road to reach the site was built increasing accessibility from the inner city.
-Some tabula Rasa sites emerged (red roofings)
- Almost all plots claimed and fenced
- Jointing of plots has started

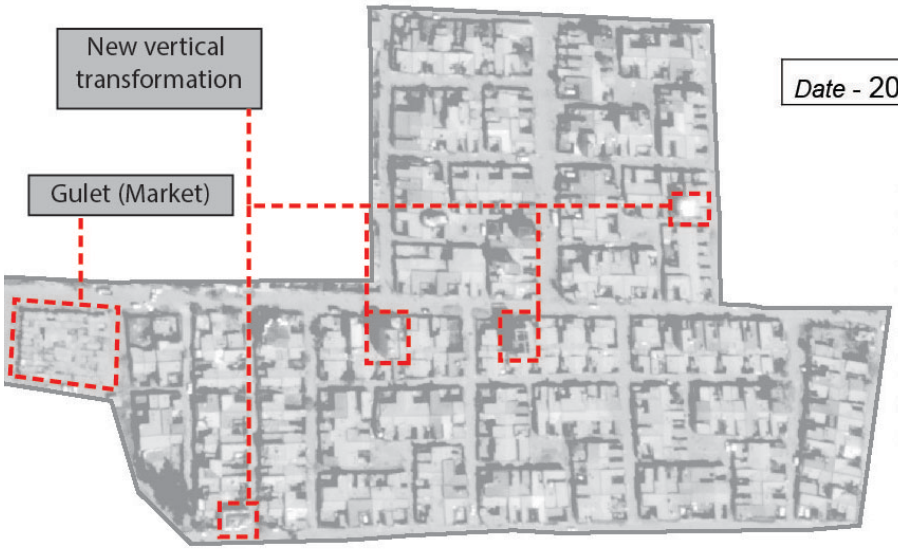


Date - 2011 GC | *Tenure* - Owner

- The first vertical transformation is observed.
- Hardly are parcel left in its original form. R types adopt front yard transformation. D type mostly adopt backyard transformation and Q type adopt both because of the availability of space from the front and back.

Date - 2014 GC | *Tenure* - Owner

- Cobble stone paving laid all throughout the site
- All except one toilet is left standing (that toilet is still standing to date to serve 5 housing units without toilets)
-Open space created in place of toilets for play and social gathering.
- Change in land use of some plots from residential to worship centers or clinics



Date - 2017 GC | *Tenure* - Owner

- Establishment of Gulet market
- More (5) vertical tabula rasa transformations
- Enlargement of plots by inclusion of extra frontage spaces left and right of the cobble stone

Figure 14: Arial Image of 'Mekelakya Sefer' in 2002,2004,2008,2011 and 2017 (Source Google Earth)

Accordingly, no conclusive evidence was found in the intermediate dates (year) between 2002 and 2019 that might be a significant factor to influence density or transformation; not even change in mode of tenure from rent to ownership. Satellite map of 2002, 2004, 2005, 2008, 2009 and beyond show that dwellers transformed their houses during tenant ship (2002-2005) and after Ownership (2005- 2019) Thus this study assumes a uniform process of changes throughout the years.

There is also no evidence to suggest that dwellers transform in any particular order. The most compelling factor on the type or frequency of transformation is the change in owner i.e. the sale of parcels to a third party. Evidence suggests that when a plot is sold, then almost immediately transformation work are began.

Generally speaking, there are some common characters of the housing transformation process. They are

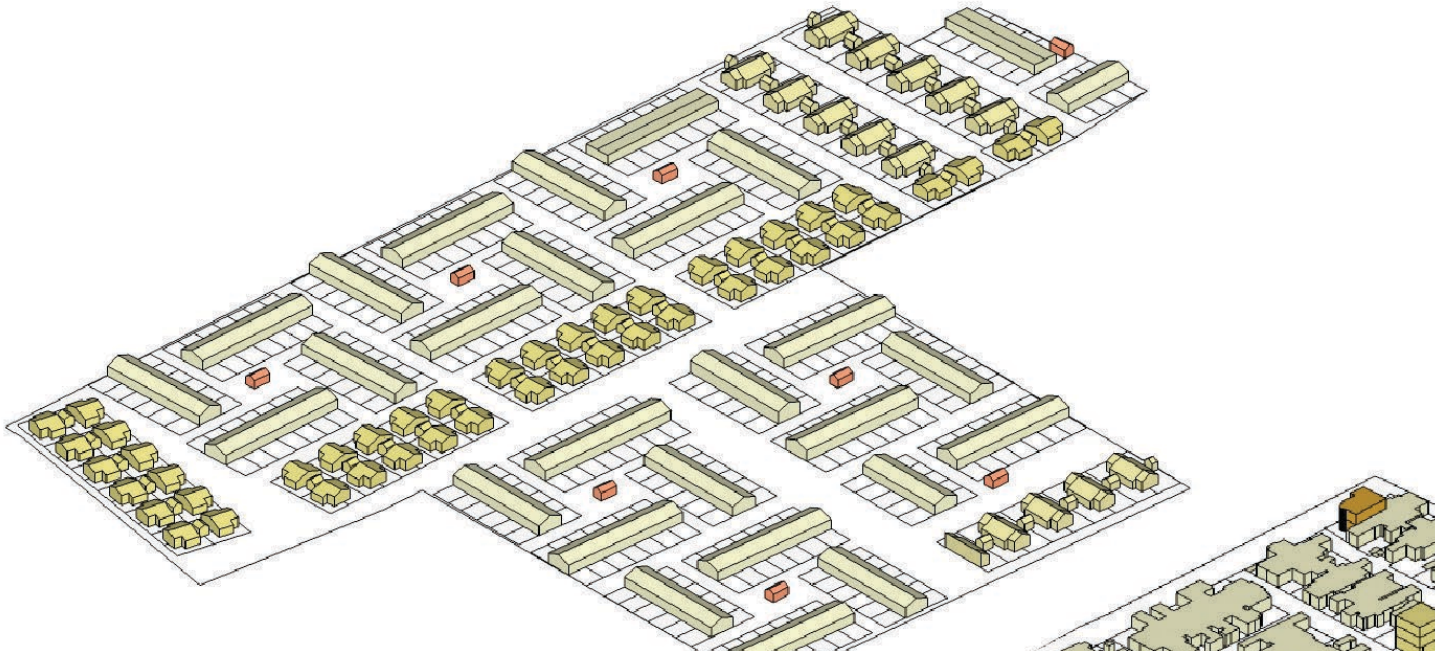
1. ***Transformations are mainly horizontal –*** 94% of all transformations are horizontal transformation. Horizontal transformations can be either extension types or tabula rasa types. But all vertical transformations are Tabula rasa types
2. ***Transformation are mainly due to social reasons***- 63.3% of the housing transformers transformed their house for social reasons such as lack of space or growing family size. Another 36.6% transformed for economic reason. As a result, 20 out of 44 have income generating activity in side their plots. 3 types of income generating activities are observed; House rent, Shop rent and Home based enterprise (beauty salon and Kiosk).

3. ***Transformation are either Extension types or Tabula rasa types-*** The majority of transformations are extension types. 84% are extension type of transformation and 16% are Tabula rasa. Both of these types have single or joint plots variety in them.

4. ***Transformations are done in 1 or 2 stages-*** 97% of transformation works are finished in 1 or two distinct stages. There seems to be little interest to do a 3rd round. This may be to the financial capacity of transformers but a more compelling reason is that by the time people finish transforming their 2nd round, the available vacant land runs out. This is another attribute of the small plots.

5. ***Transformation upgrade the quality of the houses and increase the market value of the houses-*** 70.5% of the transformed houses are finished with plastered and painted HCB wall. This is considering that the original houses were neither plastered nor painted when they were transferred to the occupants. Similarly most houses are in acceptable physical conditions. 69% of the houses are in good condition, 27% the houses are fair and only 5% of the transformed houses are in bad shape. (visible cracks, rudimentary CIS and wood extension, unplastered and unpainted)
6. ***Transformations were done according to individual interest and timeline-*** No evidence was found to suggest a cohesive pattern or timeline of transformation. Houses transformed during tenant ship (2002-2005) and after Ownership (2005- 2018) and are still under transformation currently. Nor is there evidence to suggest that there was a halt or break period of transformation (during the uncertain political atmosphere in 2005 election result). Common trends of transformation such as erecting fence or building own toilet, show the keen interest of privacy and hygiene on the part of the community. Apart from that, this research assumes a continuous process of transformation but dependent only on individual household's interest, capacity and timeline.

Figure 23: Model/ Mock uo of 'Mekelakya Sefer' from GIS cadaster base map



Common toilets and Open space usage.

As households built their own toilets in their parcel, the common toilet building became obsolete and in many cases demolished when all of the 52 housing units finish building their own toilets. This is all too common as Tipple and Ameen (1999) observed in their study in Bangladesh and elsewhere that the first priority of dwellers is to build a toilet inside their units. What makes *Mekelakya Sefer* different is that the demolishing of toilet give way to a car free, block level open space.

Out of 8 common toilet blocks, 7 have been demolished. Currently, 1 toilet block is left standing to serve 5 housing units that have not yet constructed toilets of their own. The following can be said about the transformation of the toilets and open space.

a. None of the toilets were demolished before 2005 despite the prevalent horizontal housing unit transformation inside plots. This can be because the houses were still not privatized and dwellers did not dare to demolish public property.
b. 2 of the toilets were demolished before 2008 showing that all of the households had the freedom (secure tenure) as well as the financial capacity to construct toilets early on. Since some of the property was leased to the highest bidder, we can assume a section of the community to be high income.
c. By 2014, 3 other toilets were demolished and 2 others were partially demolished. This shows that each block constructs toilets at their own pace and ability. Toilets

KEY INFORMANT 2 is a widowed lady in her early 60s. She and her neighbor came from Kasanchis area as relocatees and are considered low income. They were neighbors in Kasanchis and they are neighbors now. They have both built fences on the street side boundary but they have not bothered to erect a fence between their plots as they did not want to spend money on it and as they enjoyed each other's company. The community wanted the common toilet to be demolished as they created bad smell and hygiene problems due to their inappropriate use by passersby. When pressure came for KEY INFORMANT 2 to build a toilet for herself, she complained to the *edir* that neither she nor her neighbor could afford to build a toilet in their compound. Upon hearing this, the community pitched in with financial support and dug a small latrine with a rudimentary CIS and wood construction in the property of key informant 2 plot. But since there was never a fence between her and her neighbor, the two housing units share the same toilet until now.

are demolished after the *Edir* verifies that every home has a toilet of their own. If most have toilet and a few don't, the toilets are partially demolished.

After the demolishing of the toilets some open spaces have been paved as playfields or planting areas and others are left neglected. Yet others are used as damp sites of construction material and debris. (See Figure 24). It is hardly used for social activity such as *Edir* gathering or socializing space but it is used as an extension of household activities such as spice preparation or drying of washed carpets or on occasions like funeral and weddings.

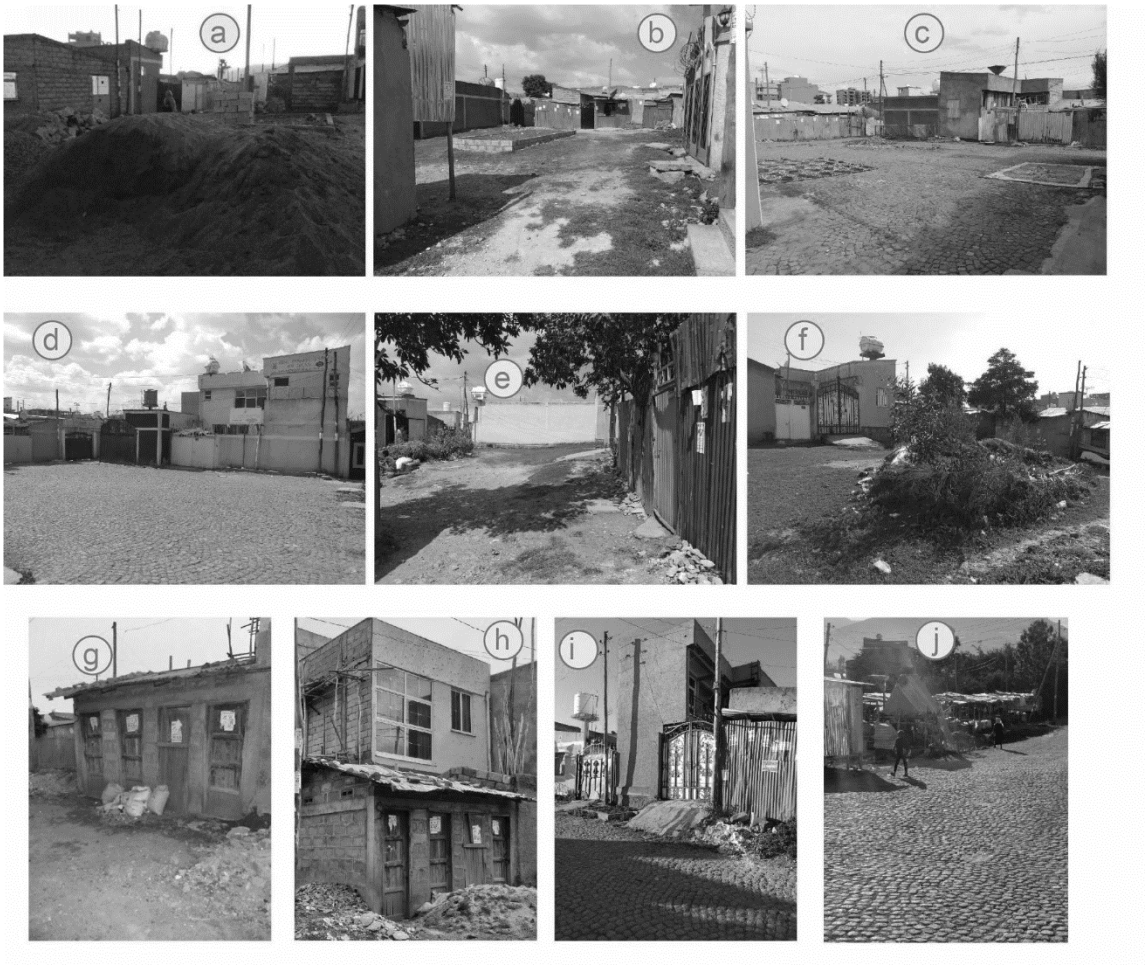


Figure 16: a, b,c,d,e,f, -Open space in place of demoilished toilet _ g & h, the last toilet left standing todate __i , G+1 R type house in 63.5sqm infront of open space _ j Local Market (gulet)

5.6. Type of housing transformation

In this section we will be discussing the different types of housing transformation observed in the site in-depth. In order to illustrate the different possibilities, examples of each variety is selected. According to the survey, two broad types of transformations are observed; Extension type and Tabula rasa type. Within these broad categories, other varieties occur such as Single or joint plot transformation, Single or multi-storey transformation. Table 19 below shows the different varieties from the survey data.

Table 19 Type of Trarformation

	Frequency	Percent
Single plot extension	28	63.6%
single plot tabula rasa	5	11.4%
Joint plot tabula rasa	2	4.5%
Joint plot extension	9	20.5%
Total	44	100%

Tipple (2000) says that more space per person is an important indicator of successful housing supply. The Aim of any housing policy designed to fight housing stress are the reduction of occupancy rates (people per room) and the increase of dwelling space per person (habitable area per person).

> "Success in either or both of these is the most likely demonstrator of whether extension activity succeeds in relieving housing stress or simply creates more space for more people to crowd into (allows an increase in population without improvements of most people's occupancy)." (Tipple, 2000)

In the case of Mekelakya Sefer, the aim was house armed force personnel who previously lived in Military camps and to house relocates (yelemat teneshewoch). But this research has shown that a significant number has been sold yet some remain in the hands of the original occupants. Furthermore, I have previously shown that transformations are mainly due to ***social*** and ***economic*** reason. So, if the transformation has been made to benefit the original household **socially**, we would expect households in transformed houses to have more habitable area and less occupancy rates and to enjoy a better life standard than non-transformers.

If on the other hand, if transformation has been made to benefit the original household **economically**, there may or may not be an increase in habitable area or a decreased in occupancy rate of the original family because a portion of their space has went of activities like house and shop rent but meanwhile we expect to see a better quality of original households. A total 8 case studies are selected for this research with 2 examples from each variety observed. Figure 25 below shows the location of the selected case studies.

Figure 17 Case study map

5.6.1. Scenario One: No transformation

Below will be examples of housing units that have not transformed (non-transformers). These examples will be used as control group for the analysis. One example each of Duplex (D) and Row (R) are identified. The site does not have any non-transformed Q (quadreplex) houses. The case of 'No transformation' is the least in number observed from all the 3 types of transformations observed in the site.

Example 1, Row Type

Mr. Lema is 56 year old man living with his recently married wife. Mr. Lema came to Mekelakya Sefer site in 2002 after being relocated from his Kebele house in Kasanchis area by the government. As a replacement, he and other households like him were asked to choose among 5 different location in Addis Ababa: Akaki Kality, Gulele, Bole, Kolfe Keranio Woreda 14 (Asko) or Kolfe Keranio Woreda 7 (Mekelakya Sefer) where the government has constructed such small plot residential neighborhood for the very purpose of replacement. He first chose the Bole site around Gergi but the weather was too cold for his liking. Finally, he came to Mekelakya Sefer and joined 2 other families have already chose Mekelakya Sefer from Kasanchis because of its relative proximity and better weather conditions.

Figure 26 Mr. Lema's House (pic)

When He first moved to the R type of house he was given, he was to pay 44.45 Birr rent. It was a single room house with no fence, a common open space and common toilet in front of the plot. In 2005, the government gave a chance for tenants to purchase their houses. Mr. Lema seized the opportunity and paid 100% of 11,712 Birr outright by asking assistance from relatives' abroad.

Although Mr. Lema doesn't have constant income and despite the lucrative business of home renting, he never felt the need to transform his house. He doesn't have a toilet and uses the one in his neighbor's plot. He says that he wants to sell the plot rather than build on it. Currently, he is married as of 2 years ago and his wife is employed in Shiromeda.

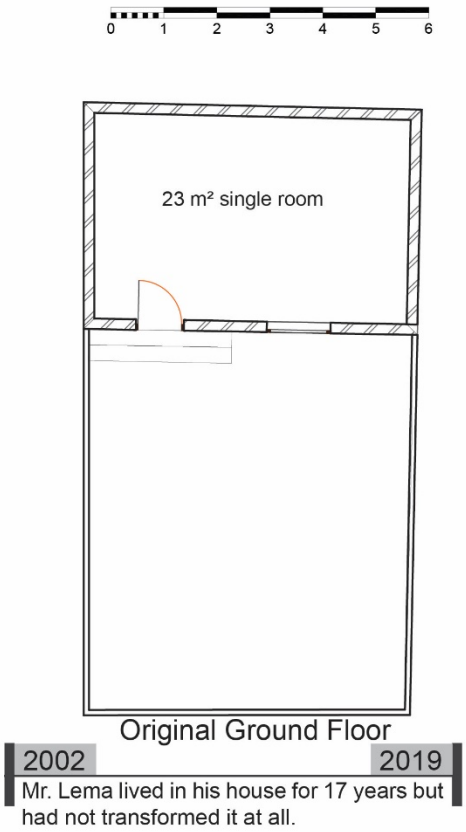


Figure 27 Mr. Lema's house plan

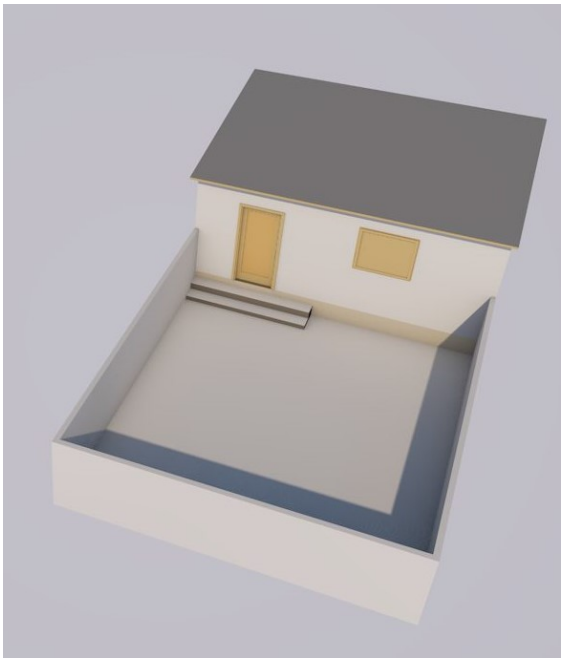


Table 20 Mr. Lema's House transformation

Mr. LEMA's NO TRANSFORMATION				
Density Parameter	2002	2019	Change in %	Remark
BAR	39%	39%	0	
FAR	0.4	0.4	0	
Total habitable area in m^2	24	24	0	
Habitable area per person	24	12	-50%	Wife moved in
Occupancy rate (persons/room)	1	2	100%	Wife moved in
Total Plot area (m^2)	61.3	61.3	0	No *'Makatet'*

Table 20 above shows the difference in habitable area per person and Occupancy rate on 2002 and 2019 numerically. The table also shows the change in percentage of the above 2 parameters. Based on that data, we can observe the following.

Because of Mr. Lema's choice to not transform and his choice to get married, he increased the number of persons living in the house without increasing neither the *number*

nor *size* of his household. As a result, he has less space per person and increased occupancy. Furthermore, his plot fails to reach the minimum FAR requirement of 0.5 and his BAR and FAR have remained the same for the last 17 years.

On a household level, he doesn't have a role in increasing the residential density of the site but he had contribution to the increase in population density expressed in increased occupancy rate.

Example 2, Duplex Type

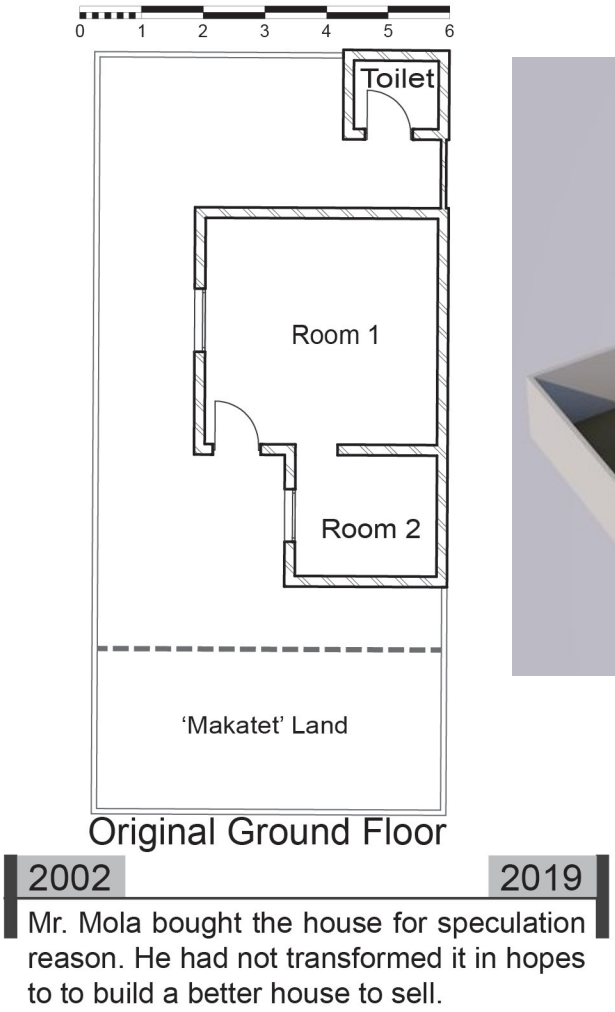
Mr. Mola has purchased a D type house from one of the soldiers in 2008. Mr. Mola already has a house in the nearby area and he bought the D type house for speculative reasons. He envisioned building a better house and selling or renting it as an income source. Thus, he never felt the need to transform the house because of his plans to tear it down and build a bigger house. Meanwhile, he rented each of the 2 rooms for different families and has been collecting rent from 2008 - 2018. Now, he has gathered enough money to start transforming and is at its initial stage of the construction process.

Figure 188 Mr. Mola's house

Mr. MOLA's NO TRANSFORMATION				
Density Parameter	2008	2019	Change in %	Remark
BAR	44%	33%	-25%	
FAR	0.4	0.3	-25%	
Total habitable area in m2	27	27	0%	
Habitable area per person	6.8	6.8	0%	
Occupancy rate (persons/room)	2	2	0%	
Total Plot area (m2)	73.5	97.6	33%	due to *'Makatet'*

Table 21 Mr. Mola's house transformation statistics

From the above table, we can see that the 'makatet' process is responsible for the change in BAR and FAR. And since there is no transformation no change is observed in habitable area or occupancy rate.



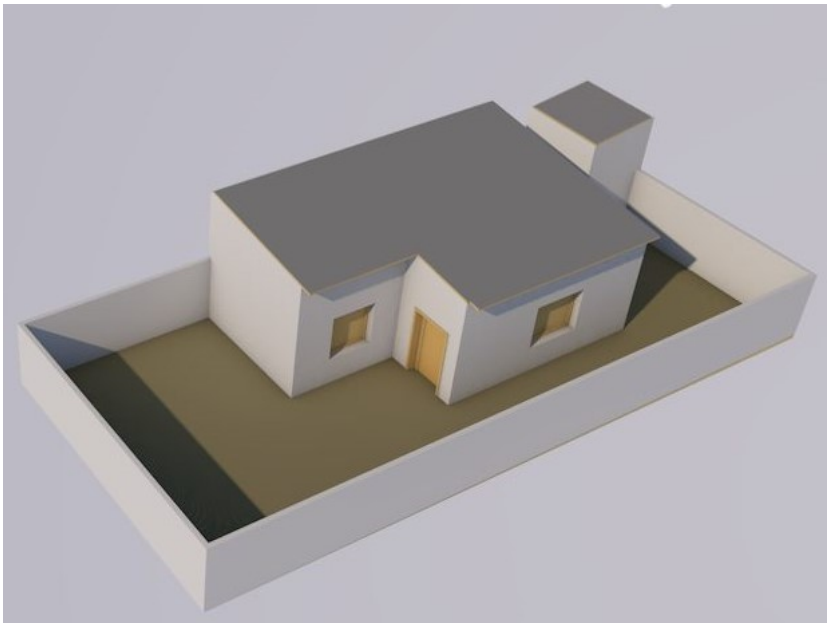


Figure 199 Mr. Mola's house plan

Mr. Mola has an increased unbuilt plot area of 24m^2. Because of his choice of not transforming, he has decreased the BAR and FAR of his site from its original state. The habitable area remains the same for the last 17years but the occupancy rate has fluctuated because of the different sized family renting the house from time to time. In whatever scenario, there is generally a decrease in habitable space per person and an increase in occupancy rate when a larger family occupies the house as the area of the housing has remained the same throughout the years.

5.6.2. Scenario two: Single or Joint Plot Extension & Alteration (Partial Transformation)

This section deals with the most common type of transformation in the site. 37 out of 44 (84%) of transformers fall in this category. This category is partial transformation and its key characters are that they are all one storey and that extensions are based upon and attached on the existing original structure. The extensions can on single or joint plot. They can either be at the front or back yard of the plots and internal alterations may or may not take place but the original structures are renovated in the process. For clarity purpose, 4 sub-cases are identified and 4 examples are presented; one for each sub-case of Q type, D type, R type and Joint R type

Example 3 Single extension, Duplex type

Mr. Tsega is a 35 year old employee at a private Bank in Addis Ababa. He came to the Mekelakya Sefer in 2013 by purchasing a D type of house from the original owner who was an armed force personnel. Previously he was living in a rented house with his wife and his daughter in the near Betel area. When he had first bought it, the house was in its original state (the previous owner had not transformed or altered the house). At the time the walls were unplastered and unpainted, the windows and doors were of old wooden planks with no glazing, the toilet shared a septic tank with 3 other houses). Mr. Tsega thought this was not a socially unacceptable housing for his family as he was living in a better quality rented house. He also felt that the number of rooms was not sufficient for his growing family as his wife was pregnant with their second child and his younger sister was living with him. He himself designed the extension of the house and hired a local foreman to draw the plans and get a permit from the Woreda. After the permit, he hired local artisans to

Figure 30 Mr. Tsega's house

construct the house under his supervision.

The Transformation process

Mr. Tsega started the transformation process in 2013 as soon as he bought the plot. The transformed the house in 2 separate stages. The first one is in 2013 and it took him 3 months and the second was in 2015. In the first stage, he had completed almost all of the works he planned. He demolished the existing toilet and altered the original two room house into a living/dining area and master bedroom. On that he added 1 master bathroom, 1 kid's bedroom, 1 kitchen, 1 guest bedroom and 1 external toilet with his own separate septic tank. He moved in with his family only after the completion of the first stage.

The second stage was 2 years after the first in 2015 and was mainly site work. He replaced the CIS fence with Block fence, he painted all the external walls with quartz paint and he paved the compound with concrete. In the Future, Mr. Tsega plans to tear down this house to construct a G+2 villa on his plot.

Figure 201 Mr. Tsega's house transformation

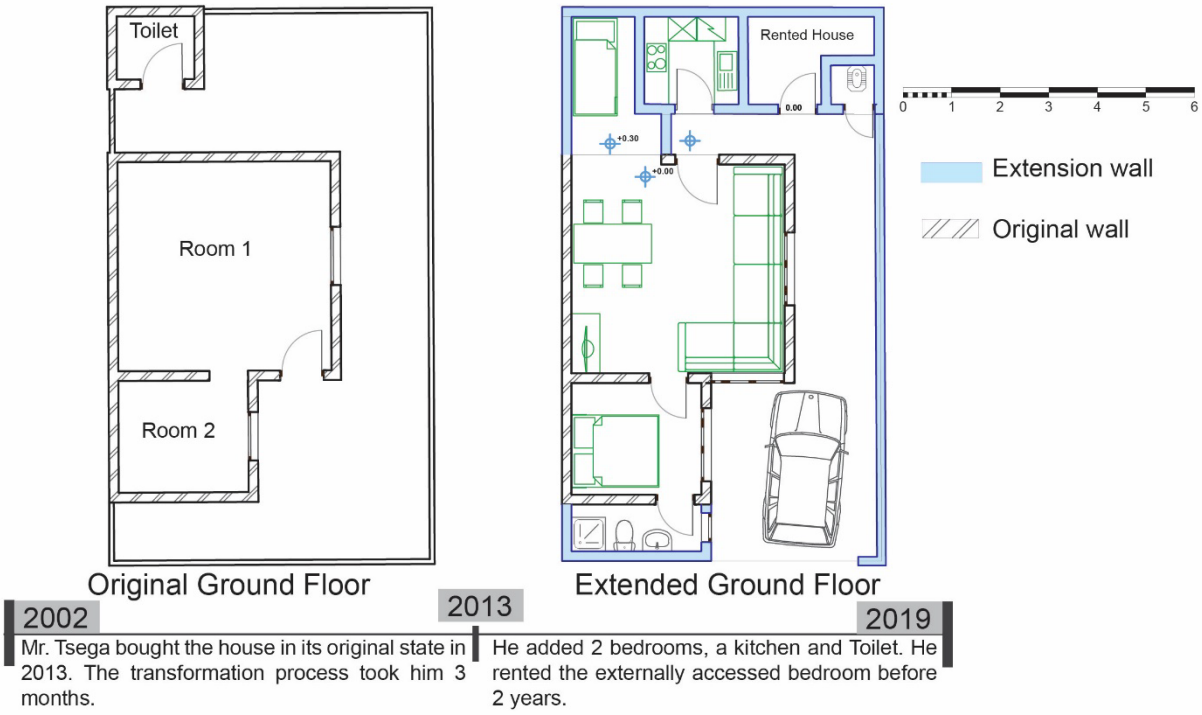
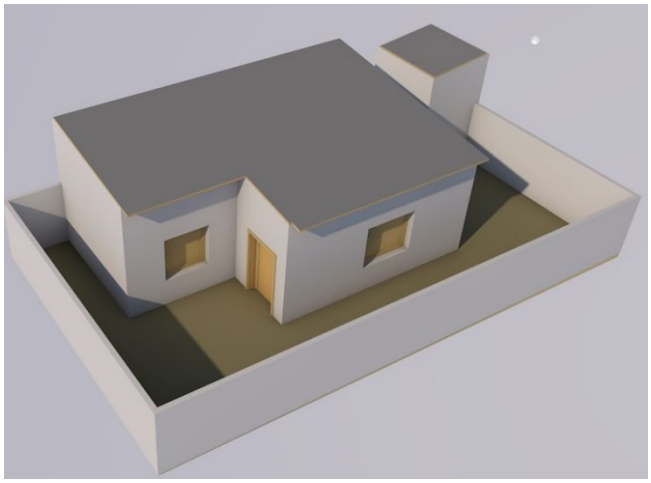


Table 22 Mr. Tsega's house transformation statistics

Mr. TSEGA's TRANSFORMATION				
Density Parameter	2013	2019	Change in %	Remark
BAR	44%	63%	43%	
FAR	0.4	0.6	50%	
Total habitable area (m^2)	27	33	22%	
income generating space (m^2)		5		house rent
Habitable area per person	6.7	8.2	22%	
Occupancy rate (persons/room)	2	1.3	-35%	
Total Plot area (m^2)	73.5	73.5	0%	No *'Makatet'*



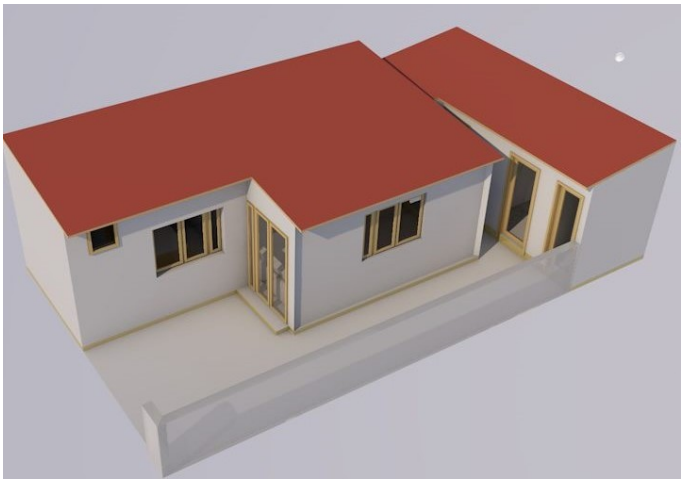


Figure 212 3D Illustration of Mr. Tsega's house transformation

Table 22 shows that there is an increase in habitable area person and a decrease in occupancy rate in Mr. Tsega's case. This is despite of

- An increase in household size (the birth of a child)
- A decrease in habitable area for the core family (renting of a habitable 5m^2 room)

The effect of his transformation are positive according to tipple definition. But there would be been a more significant change had the focus of Mr. Tsega transformation been on building what tipple considers as habitable space and not in extending non habitable space like kitchen, toilet or income generating rooms. Nevertheless, by building non habitable space, he has raised the standard of the house and has increased his income. In his case, it can be said that although the underlying reason of transformation was ***social***, he has gotten an ***economic*** benefit as well.

On a Household level, Mr. Tsega has a contribution in the increase of Household density of the site by his income generating activity. In the meantime, his plot with FAR of 0.6, is in conformity with the FAR requirement range of 0.5- 3.

Example 4 Single extension, Quadreplex type

Shalka Ayele is a 54 year old retired armed force personnel who was among the first recipient of the houses in 2002. At the time he moved into the housing with his wife and two children from the torhyloch military camp where he was working as an Electrician. From 2002-2005, he use to pay 30 Birr rent for the two room Q type of house he received. Shalka Ayele is one of the pioneers of Mekelakya Sefer and has facilitated the forming of *edir* and is still the secretary of that *edir* today. Now he is a freelance electrician doing informal work and his wife is a teacher at a nearby Primary school. Apart from his two children aged 24 and 20, he has another 10 year old daughter after he has moved in. In 2005, during the window of privatization, he promptly bought his house for 16,607.57 birr by selling land he had in Sebata area.

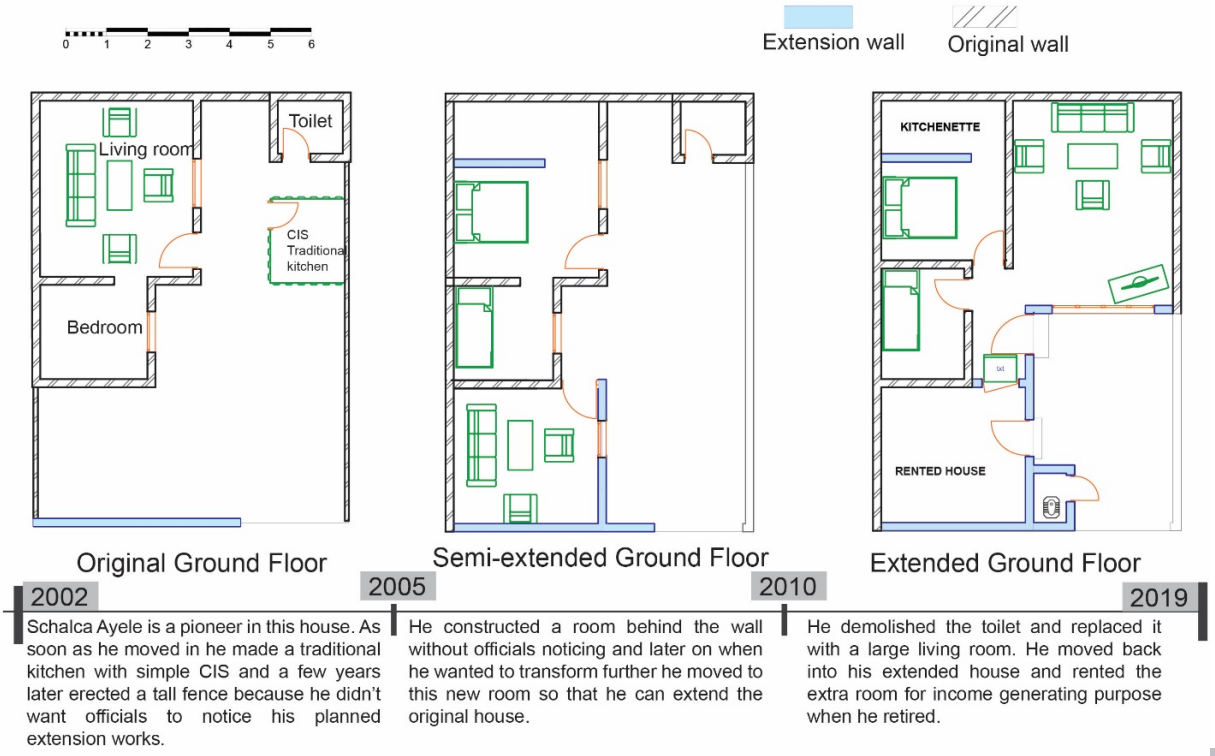
Figure 223 Shalka Ayele's house (pic)

The Transformation process

In the beginning, the defense ministry provided residents with generator for lighting purposes, water tanks to store water and CIS sheets to construct small extensions as they needed. Using this opportunity, Shalka first made a traditional kitchen soon after moving in using the CIS provided. He still did not have a fence. In 2005, after the privatization move, Shalka dismantled the kitchen and used the CIS to erect a fence. This

is because he felt that his demarcation should be clearly defined after he owned the house. Sometime later, Shalka wanted to make some transformations but feared lest the Woreda officials disapprove. Thus he built a tall HCB fence wall so that his interior construction would go unnoticed. Then after, He built a 15 m^2 room in the compound to rent out. In 2010, Shalka and his family wanted to further extend the house. His wife registered into a microfinance scheme at her primary school and secured a loan for the construction. He got a construction permit for from the Woreda and added 1 Living room & 2 toilets; one internal and one external. During the construction of this stage, the family temporarily lived in the 15 m^2 he had previously constructed.

Figure 34 Shalka Ayele's House transformation



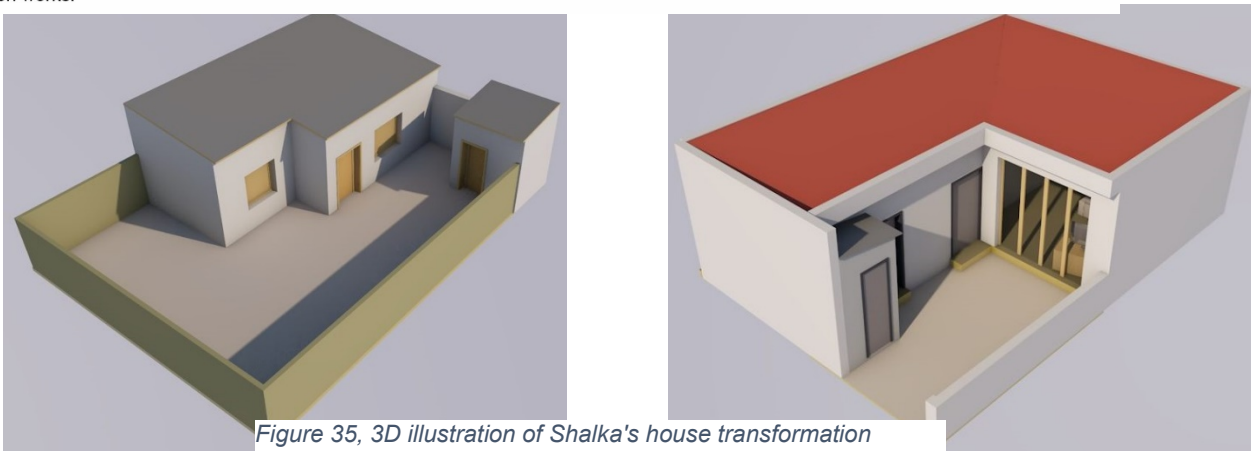


Figure 35, 3D illustration of Shalka's house transformation

Shalka AYELE's TRANSFORMATION				
Density Parameter	2002	2019	Change in %	Remark
BAR	35%	77%	120%	
FAR	0.3	0.8	167%	
Total habitable area (m^2)	25	36	44%	
income generating space (m^2)		13		house rent
Habitable area per person	6.3	7.2	14%	
Occupancy rate (persons/room)	2	1.6	-20%	
Total Plot area (m^2)	78.8	78.8	0%	*No 'Makatet'*

Table 23 Shalka Ayele's house transformation statistics

Shalka Ayele has managed to increase his habitable area per person and decrease occupancy rate (see table 23) all the while he has

- Increased his family size (birth of child and his mother moved in)
- Have a 13m^2 rentable area as Income generation

Shalka has retired and the constant income is the pension he receives and his wife employment. The added income of house rent helps him to enjoy a better living condition thanks to his transformation. Had he not transformed, he would have increased his occupancy rate from 2 to 3.1 & would not have an income generating activity in his home.

Considering residential density, the household has contributed to the increase of household density of the overall site by accommodating 2 household in a single housing unit. Shalka has more than doubled his BAR and his FAR of 0.8 is within the acceptable range of building FAR requirement of the area.

As is the case with Example 3, the transformation shows evidence of both ***social*** and ***economic*** reasons for transformation.

Example 5 single Extension, Row type

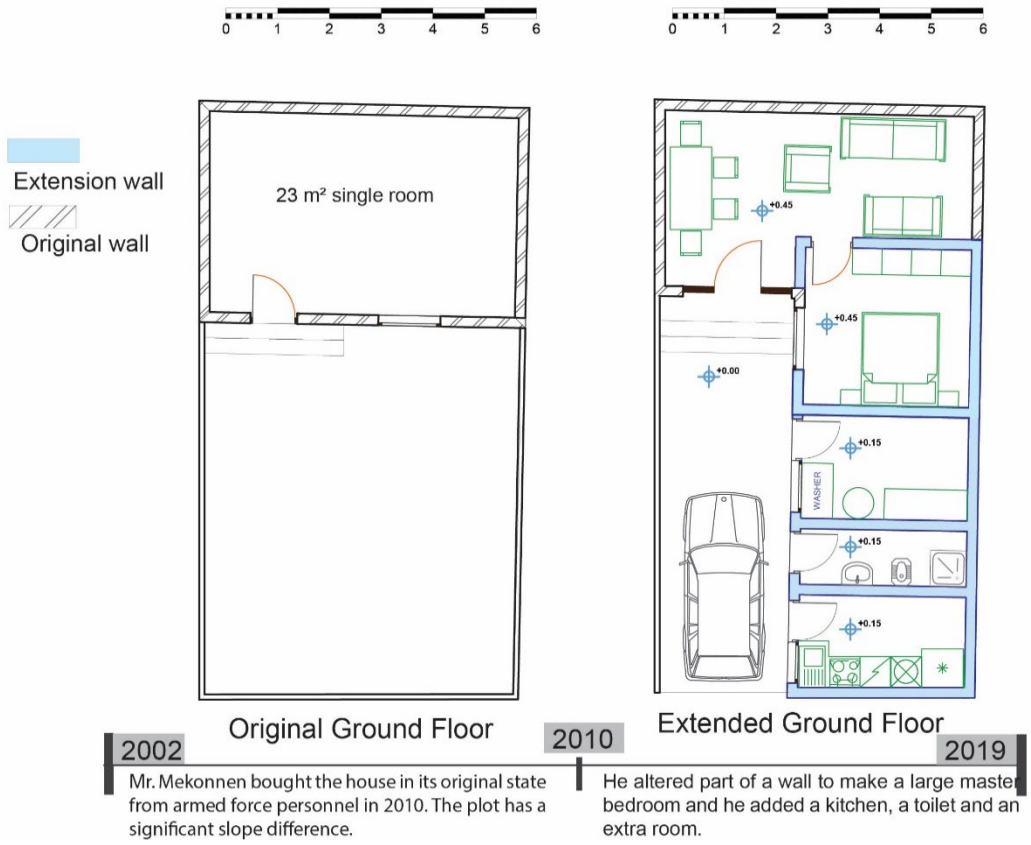
Mr. Mekonnen is a senior bank employee at a private bank in Addis Ababa. He lives with his wife and two children aged 10 and 2.He came to Mekelakya Sefer by purchasing an R type of housing in 2010. He heard of Mekelakya Se purchased a similar type of house in Akaki Kality sub that if he was interested a similar type was available in K Mr. Mekonnen then went to the site, hired brokers to loo bought a house from an armed force personnel.

Figure 36 Mr. Mekonnen's house

The Transformation

Mr. Mekonnen was in transform his plot as time of purchase, the He had made plans front connected to the original house. This is because he was worried that the house will be too small otherwise. But he could not be granted a construction permit as it would block the light and ventilation source of the original house. Mr. Mekonnen considering this and the fact that he had plans to buy a car came up with the idea of only building on the right side of the plot. That way all rooms will have windows on the left side and he would have a car park area. So instead he constructed a long narrow extension on the right side of the plot to make an 'L' type layout. He transformed his house in one stage before even moving to the house in 2011 and he has not undertaken any type of renovation up to now. Currently, he is lobbying his neighbor to sell him his plot so he can join the plots to enlarge the size of his house. He aspires to build a G+4 apartment type of house along with his brothers and sisters so that the extended family lives together. He says he is able to secure a loan from his firm if the neighbor agrees to sale the land.

Figure 257 Mr. Mekennen's house transformation plan



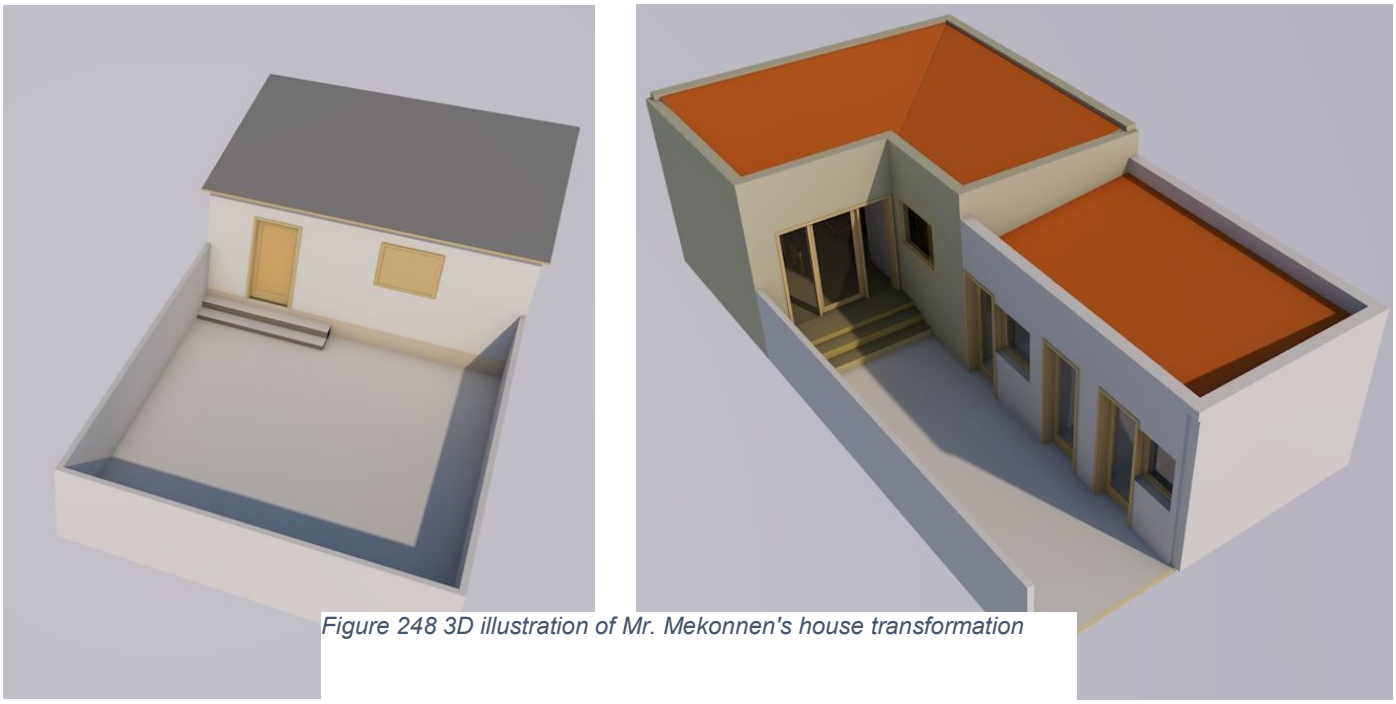


Figure 248 3D illustration of Mr. Mekonnen's house transformation

Table 24 Mr. Mekonnen's house transformation statistics

Mr. MEKONNEN's TRANSFORMATION				
Density Parameter	2010	2019	Change in %	Remark
BAR	36%	76%	111%	
FAR	0.4	0.8	100%	
Total habitable area (m^2)	23	37	61%	
income generating space (m^2)	–	-	-	No activity
Habitable area per person (HAP)	7.6	9.3	22%	
Occupancy rate (persons/room)	3	1.3	-57%	
Total Plot area (m^2)	63.5	63.5	0%	No *'Makatet'*

Table 24 shows Mr. Mekonnen's transformation has doubled his BAR and FAR. The FAR of 0.8 is an acceptable one. His increase in total habitable area has increases his habitable area per person ratio and decreased his occupancy rate even after a birth of a child 2 years ago. In the case of Mr. Mekonnen, he has a greater percentage of Habitable area per person (22%) and greater occupancy rate decrease percentage of (-57%). This is because the whole of his transformation is dedicated to increasing family space than other activities like income generation. Thus, it can be said that the transformation had purely SOCIAL reason.

Mr. Mekonnen has no contribution in the overall household density increase but has done his part in the upgrading of the plot and increasing the quality of the housing.

Example 6 Joint Extension, Row type

Mr. Tamrat is a local merchant working in Betel area. He lives with his wife and 4 boys in a joint R type of house. He and his wife came to Mekelakya Sefer by purchasing two adjacent R type houses in 2009 from the original owner who bought the land back in 2005. Despite the plot being double the size of the original R type house, he claims the two room house was not sufficient for his family. For that reason he had rented a house a few blocks away to house his children during the construction process.

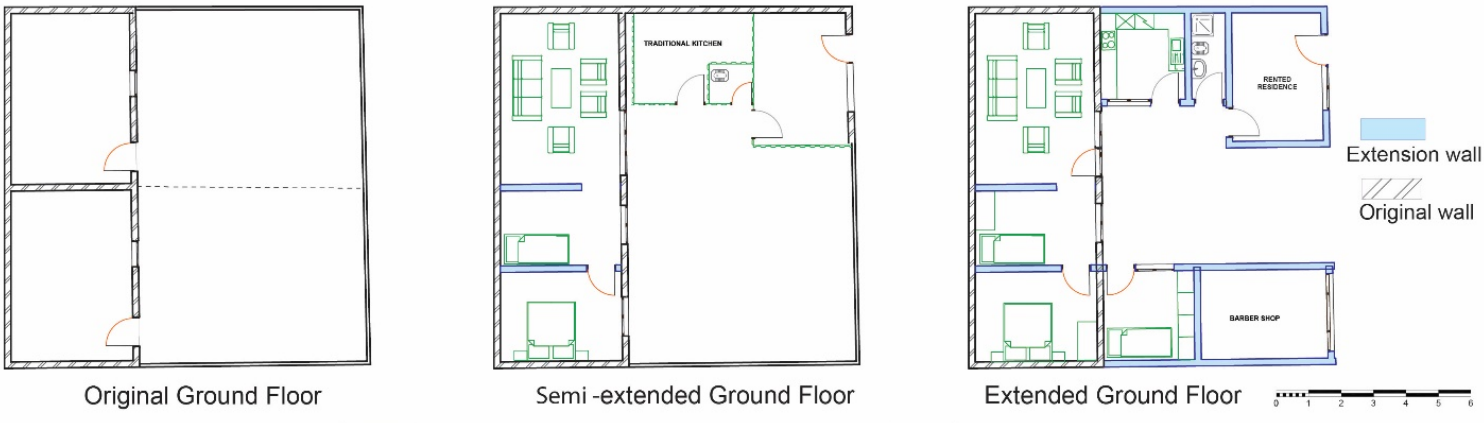
Figure 39 Mr. Tamrat's house (pic)

The transformation Process

When Mr. Tamrat first bought the house, the previous owner has already dug a septic tank and built toilet with simple CIS and wood construction. On his part, Mr. Tamrat transformed the house in 3 stages.

1st stage- he modified the existing two room house into 1 large and 2 other smaller room internally.
2nd stage- He built a traditional kitchen and one extra room on the right edge of the plot to serve as a shop.
3rd stage- He built another extra bedroom and another shop on the left side of the plot. Meanwhile he changed the material of the kitchen and toilet from CIS to HCB construction. He also painted the external and exterior walls with Quartz paint.

Figure 40 27 Mr. Tamrat's house transformation plan



2002	2009	2017	2019
Mr. Tamrat bought 2 adjacent plots and placed them under one title deed. When he bought it, the house had a septic tank and a small latrine dug by the seller.	Mr. Tamrat used simple CIS construction to add a traditional kitchen, a toilet and a room to rent. He also made alteration to internal partition walls to make 2 rooms into 3. When he gathered enough money, he proceed to the next stage.	He replaced the CIS with HCB construction on the same footprint and also added 2 rooms on the other side of his plot.	

Table 25 Mr. Tamrat's house transformation statistics

Mr. TAMRAT's TRANSFORMATION				
Density Parameter	2009	2019	Change in %	Remark
BAR	40%	74%	85%	
FAR	0.4	0.7	75%	
Total habitable area (m2)	43	53	23%	
income generating space (m2)		25.5		house & shop rent
Habitable area per person	6.14	7.5	22%	
Occupancy rate (persons/room)	2.3	1.8	-22%	
Total Plot area (m2)	120	120	0%	No *'Makatet'*

Table 25 shows the BAR, FAR, Habitable space per person and occupancy rate of Mr. Tamrat's house on 2002 and 2019 numerically. Because of Mr. Tamrat's transformation, an increase in BAR, FAR, habitable space and habitable area per person is observed. Conversely, the occupancy rate has gone down. This is despite the fact that Mr. Tamrat has a large family size (7 persons) and he has 12m^2 shop and 13.5 m^2 house for rent purposes. Thus, in addition to income generation, he now has separate bedrooms and proper kitchen and toilet area which are considered as ***environmental*** reason. Mr. Tamrat's transformation has a ***social, economic*** and ***environmental*** aspect. In fact, he found his work lucrative that he is trying to buy a second plot within the Mekelakya Sefer site.

The housing unit density of the site is affected by the choice of Mr. Tamrat to join two housing units as one. Even though the plot has a role to play in the overall reduction of the housing unit density, the fact that Mr. Tamrat has another rented household

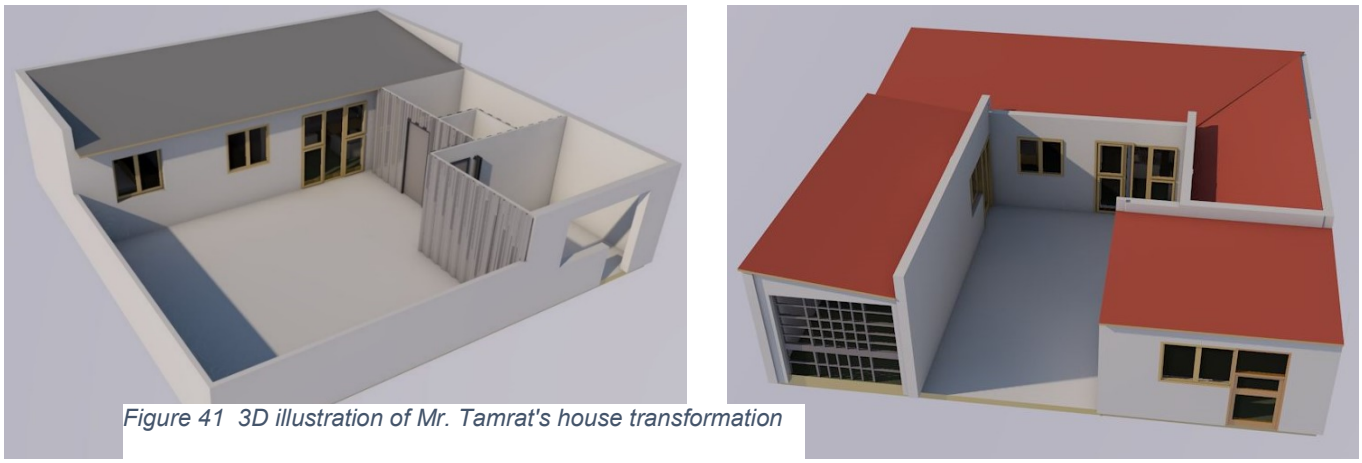


Figure 41 3D illustration of Mr. Tamrat's house transformation

contributes to the increase of household density. The difference is that 2 household per 2 housing unit became 2 households in 1 housing unit.

5.6.3. Scenario Three: Single & Joint Tabula Rasa (full transformation)

The tabula rasa type is the second most frequent type of transformation with 7 out of 44 respondents (16%) opting towards it. According to the survey, it is not the most popular as it is it takes more money and resources than extensions (partial transformations). Tabula rasa transformation are termed as full transformation because they are mainly characterized by the total demolishing of the existing blocks and starting the construction of a house on an empty plot. The tabula rasa methods presents a greater option and variety of transformation as it allows for vertical transformation as well as unrestricting design parameters.

Example 7 Single Tabula rasa, Quadreplex type

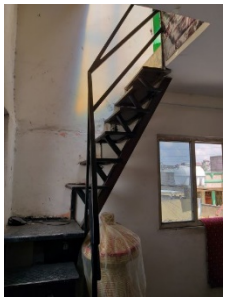


Figure 282 Mr. Habtamu's House

Mr. Habtamu is a 39 year old businessman living with his 2 children aged 10 and 6 in a G+1 house with roof deck. He was previously living in Shegole with his parents. He came to Mekelakya Sefer by purchasing a Q type house in 2007. From 2007 to 2009 he rented the house to a relative because there was no water in the site. In February 2009, when he was planning to get married, he started to transform the house to suit his future family needs. He found the house to be below the standard he and his future wife grew up in. He had first thought about extending the house on the back and front vacant spaces but he realized that he would not be able to get good sized 3 bedrooms in such a small area. So he decided to build vertically. By the time he and his wife were married, he had done the structural work

of the whole house and the finishing work of the ground floor. Thus, moved into the ground floor and continued work on the first floor while living in the ground floor. By the time he finished the whole of his house, he rented the living room and extra room on ground floor and he & his family started living on the first floor with only their kitchen on the ground floor.

The transformation process

The transformation process was done in 2 stages

1st stage- in 2009, Mr. Habtamu tore down the original structure. He built the skeleton and roofing work of a G+1 House and finishing work on the ground floor.

2nd stage- in 2011, he finished the first floor and built a small roof deck as an add-on by reducing the height of the kids' bedroom and using a make shift RHS and metal sheet staircase.

Figure 293 Mr. Habtamu's house transformation plan

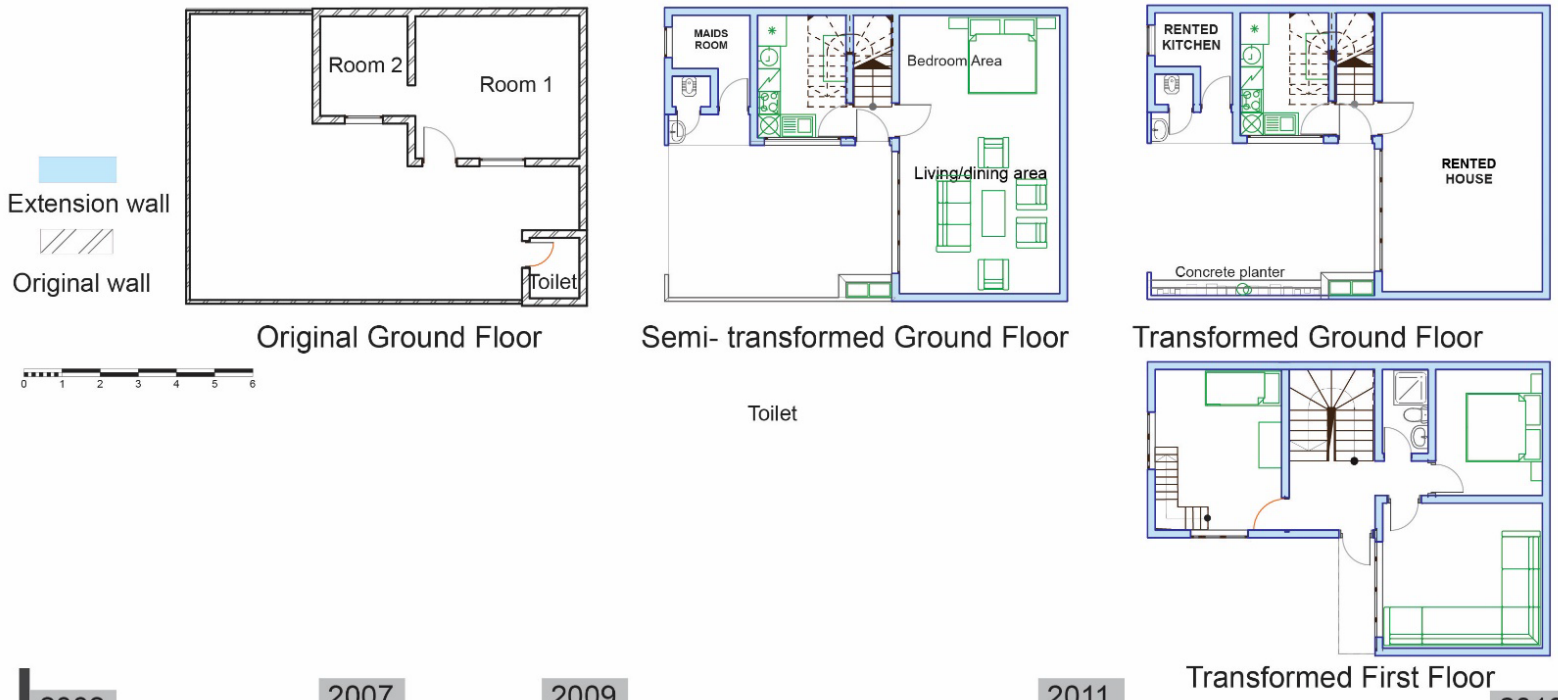


Table 26 Mr. Habtamu's house transformation statistics

Mr. HABTAMU's TRANSFORMATION				
Density Parameter	2007	2019	Change in %	Remark
BAR	35%	70%	100%	
FAR	0.3	1.6	433%	
Total habitable area (m^2)	25	44	76%	
income generating space (m^2)		38.8		house rent
Habitable area per person	8.3	8.8	6%	
Occupancy rate (persons/room)	1.5	1.6	7%	
Total Plot area (m^2)	78.8	78.8	0%	No *'Makatet'*

We can see from Table 26 that the BAR has doubled but Mr. Habtamu's vertical transformation has the greatest effect on his FAR. The FAR has increased more than 4 times/folds. Yet, the FAR is 1.6 still within the acceptable range of 0.5- 3.

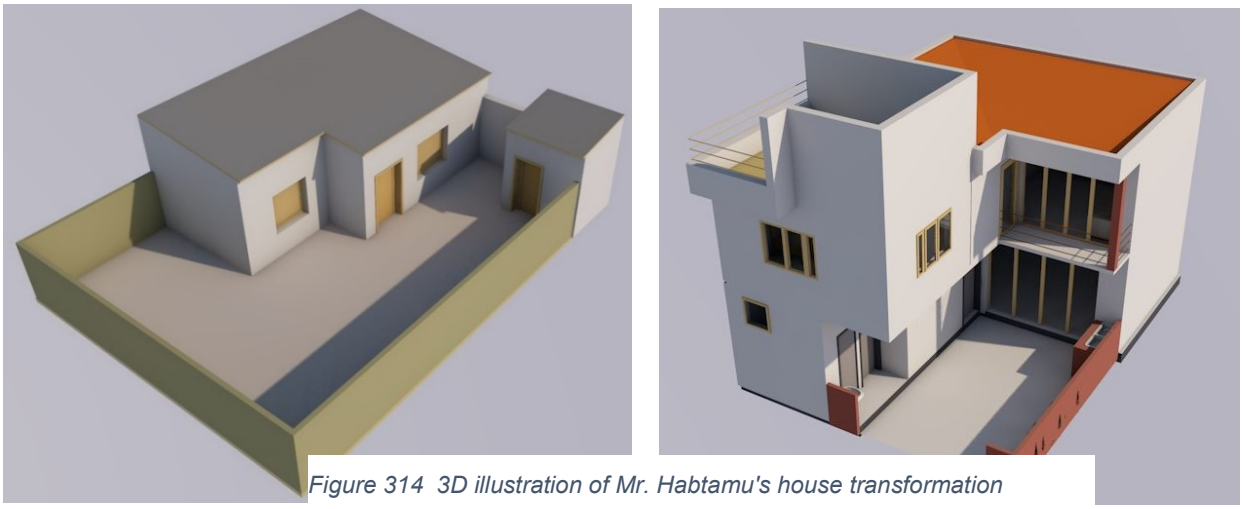


Figure 314 3D illustration of Mr. Habtamu's house transformation

Mr. Habtamu had, in grand total, built a habitable space of 82.8m^2 excluding non-habitable area of Veranda, corridor, roof deck and kitchen. This is even greater than the plot size of 78.8. It was made possible because of his vertical transformation. Yet, his decision to rent out the biggest habitable room (living room) along with an extra room has a significant impact on his habitable area and occupancy rate. These parameters only showed little change i.e. habitable area increased by 6%, conversely occupancy rate also increased by 7 % than what would have been if he hadn't transformed at all. This means that the transformation did not manage to decrease the occupancy rate but it has managed to

increase the household income and the quality of the housing. Mr. Habtamu's reason of transformation hence becomes both ***social*** and ***Economic***.

The overall housing unit density is unaffected because of Mr. Habtamu's decisions. But the household density is increased because of the choice to rent 2 rooms for another household.

Example 8 Joint Tabula rasa, Joint Row type

Mr. Moges bought 2 adjacent R type houses in 2009 from the person who bought it from the government. Mr. Moges did so for speculative reasons. He wanted to construct a one storey Villa and get income out of it. He did not like the original structure as its room height was too short and the quality was poor. Thinking that he will get a better return for his money if he built a better house, he tore down the original house and built his new house taller and wider on a larger footprint area. Mr. Moges was not interested in hiring a professional to design the new house for him as he didn't want to incur costs, thus he decided on the design from what he saw in the neighborhood. For this reason, his house looks similar in layout to the joint extended R type houses.

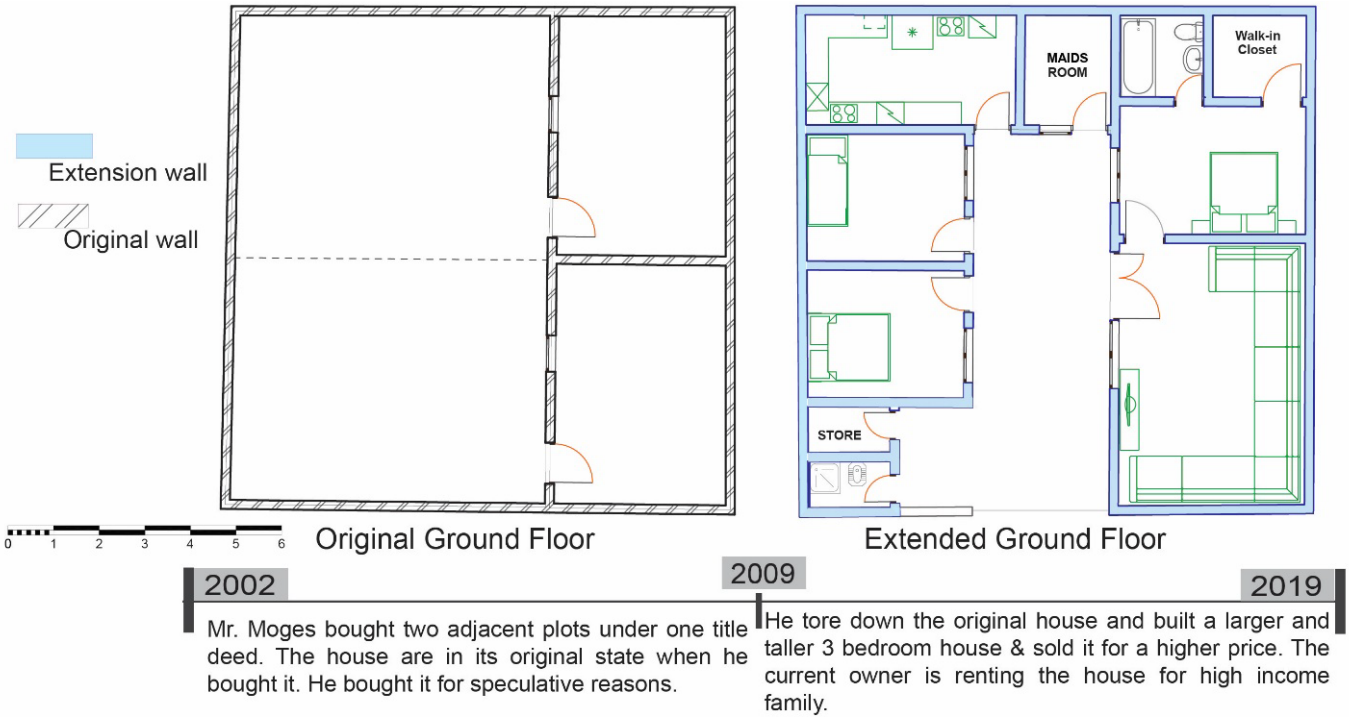
Figure 325, Mr. Moges's previous House

After finishing the house, he started renting it but the offer to sell the house proved more lucrative and he eventually sold it to another businessman. Currently, the house is being rented by that businessman to high income tenants.

The transformation process

The transformation was done in a single stage. Mr. Moges transformation did not have the low income in mind. He wanted to build a luxurious accommodation to be able to rent or sell at a high price. Thus, the reason behind all of the transformation decisions was an economic one. The site has changed hands 3 times and is now a lease-hold property.

Figure 46 Mr. Moges's House transformation plan



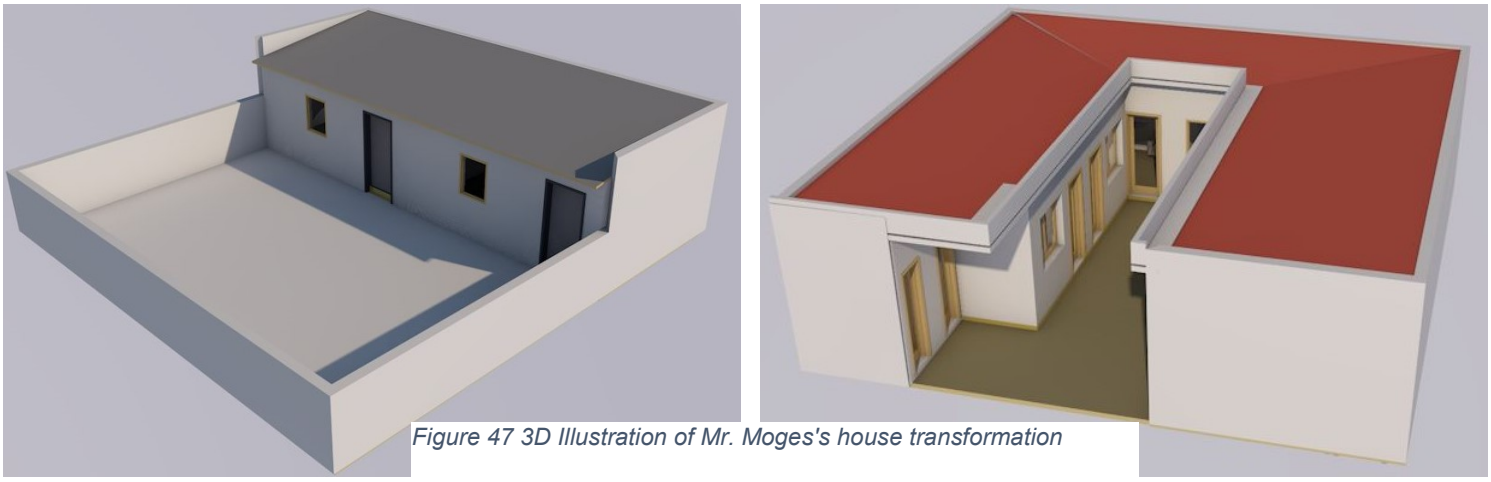


Figure 47 3D Illustration of Mr. Moges's house transformation

In Table 27 below, we see the same trend of increase of habitable area per person and a decrease in occupancy rate because of the transformation. Also Mr. Moges

transformations show increase in BAR & FAR of more than a 100%. His habitable space and habitable area per person have generally increased. This is no surprise as the main aim of Mr. Moges was to build a market oriented house with larger facilities. What may be a surprise is that there will still be a decrease in occupancy rate even if the household size increases from 7 to 11 family members.

Table 27 Mr. Moges's house transformation statistics

Mr. MOGES's TRANSFORMATION				
Density Parameter	2009	2019	Change in %	Remark
BAR	34%	71%	109%	
FAR	0.3	0.7	133%	
Total habitable area (m^2)	44	71	61%	
income generating space (m^2)				
Habitable area per person	7.9	10	27%	
Occupancy rate (persons/room)	2.8	1.8	-36%	
Total Plot area (m^2)	130	130	0%	No *'Makatet'*

* Since the house was rented several times, the author assumed an average family size of 5.57 derived from the survey data in section (5.3). Currently tenant's house hold size is 7.

On Mr. Moges's case, the housing unit density is affected by the jointing of 2 plot into one. But the Household density is unaffected in this case as the house is always rented to one household.

In the chart below, one can compare the results of the 8 examples in terms of the various density measurement parameters. It can be said that transformations on a plot level has 2 major impacts on residential density. (For detail see Table 28). These are;-

1. The plot's habitable area is increased while the occupancy rate is decreased.
2. Housing unit density on a site level is decreased by joining of plots and household density is increased by renting activity. But the rate of Household density increase is greater than the rate of housing unit density. This is because the number of joint plot is far less than the number of people who are renting houses in their plots.

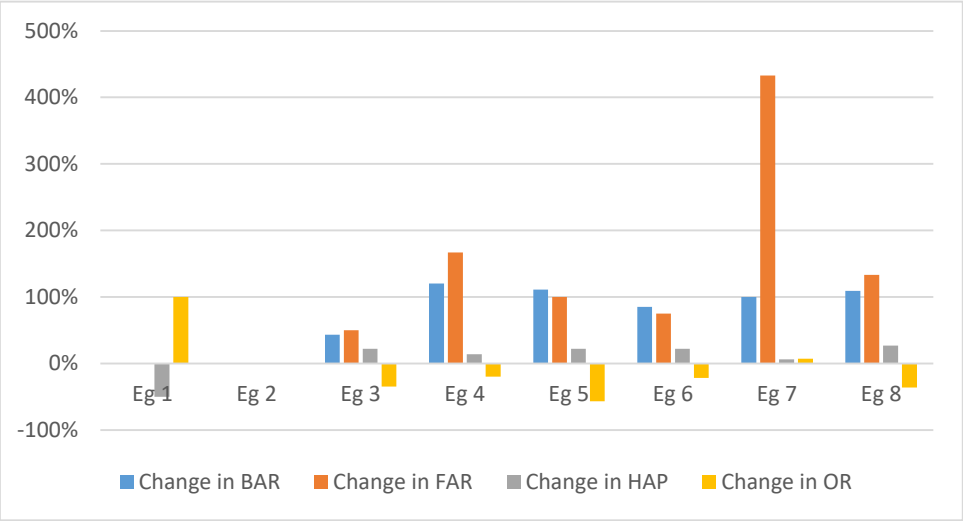


Table 28 Comparison between Case studies' transformation

	Type of house	Total plot area	Type of transformation	Reason of transformation	FAR	Change in BAR	Change in FAR	Change in total habitable area	Change in HAP	Change in OR
Ex 1	R	61.2	None		0.4	0%	0%	0%	-50%	100%
Ex 2	D	97.6	None		0.3	0%	0%	0%	0%	0%
Ex 3	D	73.5	Single plot extension	Socio-economic	0.6	43%	50%	22%	22%	-35%
Ex 4	Q	78.8	Single plot extension	Socio-economic	0.8	120%	167%	44%	14%	-20%
Ex 5	R	63.5	Single plot extension	Social	0.8	111%	100%	61%	22%	-57%
Ex 6	R (2x)	120	Joint plot extension	Socio-economic	0.7	85%	75%	23%	22%	-22%
Ex 7	Q	78.8	Single plot Tabula rasa	Socio-economic	1.6	100%	433%	76%	6%	7%
Ex 8	R (2x)	130	Joint plot Tabula rasa	Economic	0.7	109%	133%	61%	27%	-36%

Regardless, of the reason for transformation, most of the examples have managed to achieve what Tipple (2000) has claimed about the aim of transformation; i.e. increase of habitable space per person and decrease of occupancy rate. In some cases an additional benefit of income generation has been achieved through the transformation process. Not all of the transformation process is connected with residential density though. Only the above mentioned two of the activities under the transformation process have significantly affected the residential density in terms of both housing unit and household density.

6. CHAPTER SIX –SUMMARY OF FINDINGS & RECOMMENDATIONS

The aim of this research is to investigate the relation of transformation with residential density in the case of Mekelakya Sefer. The results presented can be seen as ***major*** and ***supportive*** findings. The major findings are those that are answer the 'what?' part of our research question. These findings are directly linked to density and transformation. The supportive findings are those that answer the 'why' part meaning that they help us better understand the reason behind why the major findings happened.

6.1. The state of the current Mekelakya Sefer

The 504 housing units were first constructed by the government 1998-1999 as prototype project to house *'yelemat teneshewoch'* from different part of the city. These types of projects were meant for low income families and deemed affordable. The prototype was repeated in 5 different sites in Addis Ababa. In this particular case, these houses were meant for people evacuated to make way for the Sheraton Hotel. After the Sheraton project administration rejected these houses, the site had stayed idle for 3 years before the Defense ministry took custodianship of the houses and gave a total of 168 units as rent accommodation to its members in 2002. Some of the remaining houses were allocated to *'yelemat teneshoch' in the same year.* Whatever was left was sold off in a tender to the highest bidder in 2005. 2005 was also the same year that the privatization scheme was allowed and where almost all (except 5) households bought their housing at the initial bid price of the bidders i.e. 16,607.57 Birr. A number of changes are observed in the state of Mekelakya Sefer currently.

1. Data from the survey shows that, a good portion of the initial buyers have sold off their property. 31 out of 44 (70.5%) have a lease-hold property signifying that the free-hold was changed to leasehold because of purchase transaction. This leads the author to deduce that there is a level of gentrification because the high income household were introduced to the site starting from 2005.
2. There is a practice of renting the entire housing unit and also the practice of renting rooms in the area. 25% of housing units are occupied by tenants. From the rest of the 75%owner occupied housing units, 87.5% have rented rooms for residential purposes. The rest of 12.5% have rented rooms for commercial purposes.

3. Demography data of survey shows that 81.7% of household's head are below the age of 50 and have a relatively young family than the families of the Soldiers. This can be the reason behind the extensive transformation activities seen

6.2. The extent of housing unit and household density

The 3 typologies of houses are Quadreplex (Q), Duplex (D) and Row (R). Their numbers were 56, 92 and 356 respectively. They were placed in 5.5 hectare land. One housing unit was given to one household. Thus, in the initial stage, the housing unit and household density was equal and the net and gross density is calculated to be 92 HU/Hec and 75HU/Hec respectively. Even then, this is well above 50HU/Hec minimum the regulation requires now.

Currently both the housing unit and household density are changed. The major factor for the change in housing unit density is the ***joining of plots*** and the major reason for the change in household density is the practice of ***room renting***. The results are;-

1. The extent of Joining of plots is significant. The number of housing unit dropped from 504 units to 419 units (85 units less). The housing unit density is dropped from 92 HU/Hec to 75HU/Hec.(see Table 29) What is unique about the drop is that all of the joining activity was *solely* observed on only Row (R) type of houses. This is the reverse of the common practice of sub-division of plots prevalent in the city. There are 3 reasons behind these phenomena
    I. The Q and D type of houses were originally given to the armed forced personnel thus when the move to privatize was allowed, each household bought his own plot and could not get the access or money to buy a neighboring one.
    II. Many of R type of houses were sold off to the highest bidder and bidders were allowed to compete for more than one plot. Thus bidders owned two or more adjacent plot in a single title deed upon winning the bid.
    III. The R type is the smallest of all the plots thus it is possible that when new buyers become interested to own a house in that area, would want to merge them to get a larger plot. Evidence for this is that 73.3% of people who transformed their house stated it is because the house was too small for 1

family of 5 to live in. In addition the 30% of the respondents perception of density of the area is revolves around the smallness of the plots.

2. The household density has increased because of renting activity within a housing unit. 36.4% of the respondents of housing units reported to have extra rooms for house rent purposes and the rest 63.6% don't. Ironically, the 36.4% accommodate almost ***double the number households than the 63.6 that don't rent out rooms***. Given this data, the household density estimated to have increased from 92HH/Hec to 138HH/Hec from 2002 until 2019. (See Table 29) Although, this research was not able to identify the reason behind such extensive practice, the economic benefit on the part of the landlord and the desire to reduce expenditure (by sub-renting) from the part of the renter seem to play a role.

Table 29 Summary of Mekelakya Sefer's residential density in 2002 and 2019

	Net Housing unit density	Household density	Gross Housing unit density	BAR	FAR
2002	92 Hu/Hec	92HH/Hec	78 HU/Hec	37%	0.4
2019	75 Hu/Hec	138HH/Hec	65 HU/Hec	65%	0.7
• FAR requirement of Master plan is 0.5 -3 • Gross housing unit density requirement of master plan is 50 -100HU/Hec					

Generally, the Housing Unit density has gone down but the Household density has gone up.

3. Both the BAR and FAR of the site have increased dramatically. This is mainly because of the extensive housing transformation and the enlargement of some plots by the process of '*Makatet'.* The process of *'Makatet'* has contributed 8% increase in the overall parcel area which is a total of 2937 m^2 extra to the original parcel area in 2002. As a result, the combined parcel area of the 3 typologies together increased from 3.5 to 3.7 hectares. Similarly, vertical transformations have contributed 2764m^2 more floor

space to the increase in the FAR. So far there are only 20 vertically transformed buildings but there are 4 more others are under construction.

6.3. The process of transformation

The extent of transformation is such that one can hardly find houses in their original state. The original 1 or 2 room typologies have now become 1-4 bedroom type houses. Survey data shows that 14% are 1 bedroom type, 32% are 2 bedroom types, 38% are 3 bedroom types and 16% are 4 or more bedroom types. Again this may be attributed to the needs of the new demography living in the area with a relatively large and young family. The survey data shows some common characters of the housing transformation process. They are

1. Transformations are mainly horizontal
2. Transformation are mainly due to social reasons-
3. Transformation are either Extension types or Tabula rasa types
4. Transformations are done in 1 or 2 stages
5. Transformation upgrade the quality and increase the market value of the houses
6. Transformations were done according to individual interest and timeline

6.4. The impact of transformation in relation to housing unit and household density

In order to relate transformation with density, it is important to note what Tipple (2000) says is the 'smoking gun' of housing transformation. That is when transformers transform their main priority is to get more space (per person). In the case of Mekelakya Sefer, social transformers transform to get more space for ***living activity***; and Economic transformers transform to get more space for their ***income generating activity.*** And some for both.

The impact of transformation on the density is realized as *an* ***Indirect*** *or* ***auxiliary effect*** of transformers trying to better their housing on a plot level. When agglomerated, this plot level activities have visible effects on the housing unit and household density.

This research has identified 4 different impacts of transformation on housing unit and household density. These are;-

I. Transformations that affect the Housing unit density only
II. Transformations that affect the Household density only
III. Transformations that affect both the Housing unit and household density
IV. Transformations that affect neither Housing unit nor the household density

Data from the case study show that the decisions of the type and reason of transformation has an impact on the either or both of the density types. Table 30 below shows that in each and every transformation, Habitable area per person (HAP) was increased and Occupancy rate (OR) people per room was decreased except for non-transformers. This means that the main goal of their own transformation is achieved. The added (side effect) impact on density will be demonstrated with the following examples.

Table 30 Assessment of transformation impact

	Type of transform	Reason of transform	Change in BAR	Change in FAR	Total habitable area	Change in HAP	Change in OR	impact on HH density	Impact on HU density
Ex 1 (Mr. Lema)	None		0%	0%	0%	-50%	100%	No Impact	No Impact
Ex 2 - Mr. Mola	None		0%	0%	0%	0%	0%	No Impact	No Impact
Ex 3 -Mr. Tsega	Single plot extension	Socio-economic	43%	50%	22%	22%	-35%	✓	No Impact
Ex 4 - Shalka Ayele	Single plot extension	Socio-economic	120%	167%	44%	14%	-20%	✓	No Impact
Ex 5 - Mr. Mekonnen	Single plot extension	Social	111%	100%	61%	22%	-57%	No Impact	No Impact
Ex 6 - Mr. Tamrat	Joint plot extension	Socio-economic	85%	75%	23%	22%	-22%	✓	✓
Ex 7 - Mr. Habtamu	Single plot Tabula rasa	Socio-economic	100%	433%	76%	6%	7%	✓	No Impact
Ex 8 - Mr. Moges	Joint plot Tabula rasa	Economic	109%	133%	61%	27%	-36%	No Impact	✓

a. Example 1, 2 chose not to transform. Example 5 transformed his plot for Social reasons. Example 5 did not rent out any room nor did he join adjacent plots. Both these cases did not do anything to change the Housing unit or Household density. Density remained 1 household in 1 housing unit. Therefore, ***non-***

transformers and ***social transformers*** on a ***single plot*** have ***no impact*** on the density.

b. Example 3, 4 and 7 all did a single plot transformation (be it extension or tabula rasa). All of them have extra room they rent for residential purposes. By doing so they have increased the number of households without increasing the number of housing units. Therefore, ***economic activity*** (House rent) on a ***single plot*** has an ***increasing effect on household density*** but has ***no impact*** on ***Housing unit density.***

c. Example 8 has joined 2 plots, transformed it and rented it to a single family. Because of his decision to joint 2 plots together, he has an effect in decreasing the housing unit density. But because there is one family in one housing unit, this has no impact on the household density. Therefore, ***joining of plots*** has a ***decreasing effect*** on the ***housing unit density***.

d. Example 6 chose to join his plot and also rented a room for residential purposes. His decision to join plots has decreased the HU density and his decision to rent has increased the HH density in the area. Therefore, transformation with ***economic activity*** (house rent) and ***joint plot transformations*** have an impact on ***both Housing unit and Household density.***

6.5. Conclusion

To better capture, the relation between housing transformation and residential density in the case of Mekelakya Sefer, Figure 52 draws their relationship as the 4 possible arrangement of increasing or decreasing effect of housing transformation. Consequently, 4 distinct quadrants are formed representing the 4 different relationship between transformation and density.

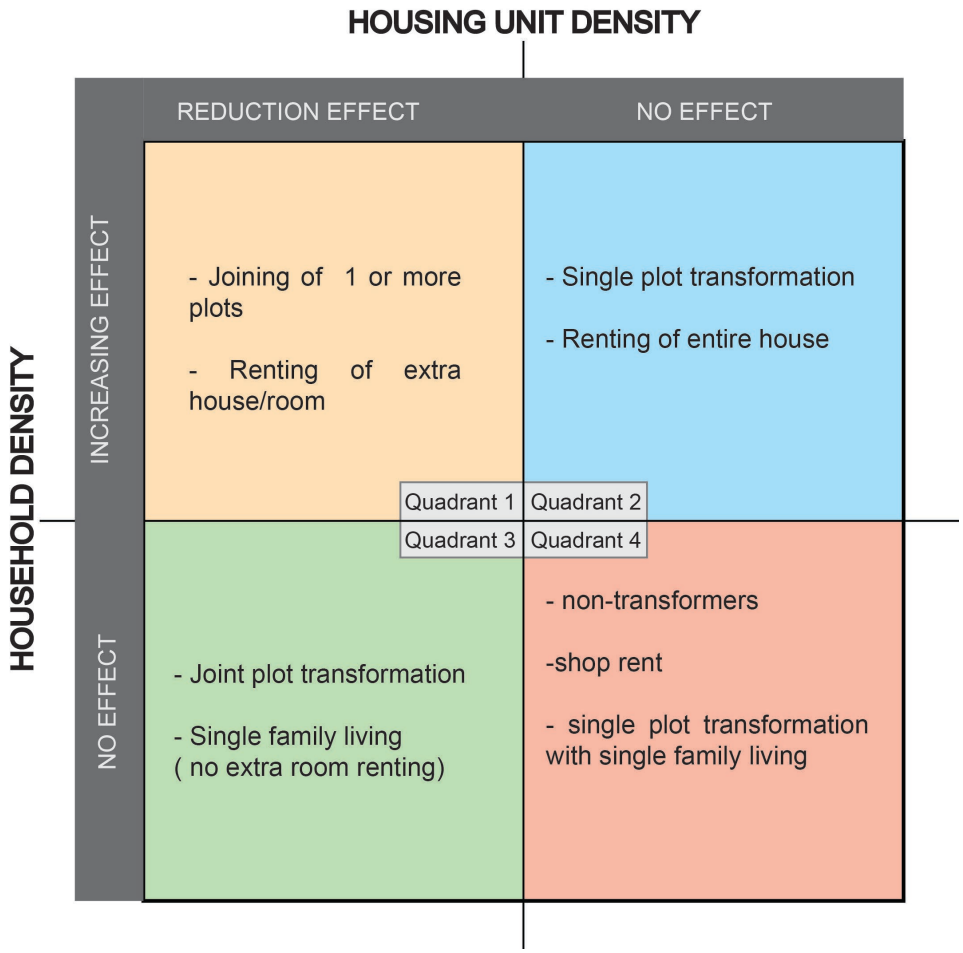


Figure 48 the 4 impacts of transformation on density

It is clear to see that as housing units density decreases, household density increases in the case of Mekelakya Sefer. Generally speaking, it is the ***2 major activities of Joining of plots*** and the ***renting of extra rooms*** for residential purposes that are the ***causal reasons*** for the impact on housing unit and household density.

6.6. Recommendation

Based on the analysis, the paper proposes the following recommendations categorized in 3 broad categories. The first one regarding Space and layout, the second regarding implementation and the third regarding further study.

RECOMMENDATION ON SPACE AND AYOUT

1. The allocation of small plots is advantageous to house many dwellings in an area hence achieve greater density. Yet when the site is too small, dwellers tend to join them. This paper recommends that minimum plot size determination should consider socio-economic & demographic character of residents and potential demographic change in the future. In Mekelakya Sefer and similar conditions, plot area smaller than 70m^2 or a plot with less than 6.5 meter frontage should not be given as a residential plot.
2. Transformation activities are beneficial in terms of providing new, diversified and affordable households with better access to urban services. Mekelakya Sefer's transformation specially caters for a special group of tenants in need of small sized housing. Nevertheless, they is room for improvement and the transformation could still be more efficient.

   The paper recommends the layout and placement of original low cost houses should be designed with maximum vacant area on the front or back part of the plot to allow for space efficient transformation. Since the plots have small frontages (narrow and long), pieces of land left on the sides of the plots cannot be extended efficiently.

   On the other hand, transformations should be carefully monitored so that they don't result in poorly lighted and ventilated houses and that building regulations are observed.
3. The security of tenure even of a small plot of land has helped owners to transform their houses as much as the land can allow it. Yet, transformers run out of land before achieving their space requirement.

The paper recommends alternate land allocation schemes in which vertical development is encouraged. In such a way, total area of the habitable space can be greater the area of the plot. In the case of Mekelakya Sefer and similar developments, walk up apartments and low & midrise apartment blocks on joint or single plots can result in greater habitable area per household.

RECOMMENDATION REGARDING IMPLEMENTATION

4. The literature advocates that higher density residential areas are good for sustainable reasons. But in the case of Mekelakya Sefer, the smallness of the plots encourages dwellers to ignore set back regulation and build crammed houses with little or no open space. This in turn have creates a sense of higher perceived density than the low density the site actually is. This paper recommends that a stricter implementation of building set back regulation.
5. The initial plan of housing low income households has been hijacked by housing policy changes that allowed for immediate privatization of government houses by way of tender. Measures to ensure that low income households get better access to such housing types should be put in place.
6. The lack of documented data about the residential density on the Woreda or sub city level, has contributed towards unchecked increase o household density while decreasing housing unit density. The paper recommends that the government should put in place residential density implementation and monitoring strategies to make sure that the housing unit density is line with its policy to provide suitable and sustainable residential neighborhoods.

RECOMMENDATION FOR FURTHER RESEARCH

The paper recommends further detailed study on transformation of other types of housing such as cooperatives, rentals etc. and also studies assessing the infrastructure and urban services needs transformed neighborhood require can help in the planning for future neighborhoods.

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ANNEX I

Interview with Government official

The Interview with Ato Fasil Bekele, Head of Housing development and finance in Kolfe Keranio sub city, was conducted on March 18, 2019

Discussion points

- History of Mekelakya Sefer
- Current housing dwellers of Mekelakya Sefer
- Modality of Acquisition and tenure of Mekelakya Sefer
- Government laws and regulation regarding the transfer of houses to dwellers
- About another prototype of small plot in the same sub city Woreda 14 (Asko Sefer)

ANNEX 2

Questionnaire used to conduct Survey and Case study

SURVEY QUESTIONAIRRE

Section 1. FAMILY PROFILE

Section 2. PLOT AND HOUSE

<table>
<tr><td rowspan="2">HH head use to live where?</td><td rowspan="2"></td><td>Age</td><td></td><td rowspan="2">Marital Status</td><td colspan="4" rowspan="2">1. Married
2. Single
3. Widowed</td></tr>
<tr><td>Sex</td><td></td></tr>
<tr><td rowspan="2">Primary transport means (a)</td><td rowspan="2">1. Private car
2. Taxi
3. Bus
4. Foot</td><td>Move in date</td><td></td><td rowspan="2">Occupation</td><td colspan="4" rowspan="2"></td></tr>
<tr><td>Previous house</td><td></td></tr>
<tr><td rowspan="2">Sources of Income(b)</td><td rowspan="2">1. Government
2. Rent of house
3. Remittance & Pension
4. Private
5. Others</td><td>House typology</td><td></td><td>Male</td><td>Female</td><td><14</td><td>14-49</td><td>>50</td></tr>
<tr><td>House hold size</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Mode of tenure	1. Owner 2. Tenant 3. Custodian	**Plot size**		**Use of plot**	1. Residential only 2.Commercial only 3. Res+ commerce 4. Others…….	**Wall**	1. HCB 2. Brick 3. CIS 4. Mud 5. Others…… ……
Mode of housing acquisition	1. From gov't "Rent" 2. Lease 3. Purchase ……. degree 4. Tenant	**Storey**		**Physical structure**	1. Plastered & painted HCB 2. Unplastered & unpainted HCB **3.** Unplastered & painted HCB **4.** CIS & wood **5.** …… ……..	**Floor finish**	1. Screed 2. Floor tiles 3. Carpet 4. Others…… …
Type of house currently	1. Apartment type 2. 1 bdrm type 3. 2 bdrm type 4. 3 bdrm type 5. Other	**Built up area**		**Physical condition**	1. Excellent 2. Good 3. Fair 4. Bad	**Ceiling**	1. Gypsum Board 2. Plywood/ chip wood 3. Gypsum decoration 4. No ceiling

SECTION 3. HOUSE and TRANSFORMATION

1. Have you transformed your house in any way?
   a. Yes b. No c. I can't I am a private tenant

2. If 'Yes' when did you first start transformation?.....
3. If 'Yes' what was the reason behind your transformation?
   ……
   a. Economical reason c. social reason
   b. Cultural reason d. environmental reason
4. What type of transformation did you take?
   a. front yard Extension c. Joint plot Tabula rasa
   b. single Tabula Rasa d. Alteration/ interior
   e. others specify…….
5. In how many phases was the transformation undertaken?
   a. At once b, In 2 stages c. in 3 stages d. others…….
6. Who many households are dwelling in this compound?
   ……..
7. If more than one, what is the relation between the other households?
   a. Married Offspring b. tenants c. relatives
8. Do you have income generating activity in the house?
   a. Yes b. No
9. If 'YES' what type of economic activity is it?
   a. House renting c. Home based enterprise……

b. Shop renting d. Others……

10. Did you take permission when you constructed?
    a. Yes b. No

SECTION 4. DENSITY RELATED

11. How do you perceive the number of people living in this community?
    a. Small density c. High Density
    b. Medium Density D. Crowded

12. What indicators did you use to pass judgment about the crowdness of your community?
    ……
    ……

ANNEX 3

CASE STUDY QUESTIONNAIRE

SECTION A. PROFILE

HH Head name		Age		Sources of income		House type & House No	
HH size		Marital Status		Monthly income		Date of Housing Occupation (as rent)	
Tenure type	Owner tenant	Sex		Where u lived previously		Date of house purchase	

Family Profile

No	Member relation	Age	Sex	No	Marital status	Transport means (car, taxi, foot)	Remark

SECTION B. HOUSE AND TRANSFORMATION

1. When did you move here?.....
2. How did you acquire this house?
   a. From gov't(as rental) b. Lease c. Purchase from owner d. 2nd degree purchase e. Others specify……..
3. How many households (families) live in this plot?.....
4. Housing at its current state.

Rooms	**Number**	**Size(area)**	**Material**			**Placement**
			Wall	**Roof**	**Floor**	
Total Rooms						
Bedrooms						
Living rooms						
Kitchen						
Toilet/ Bath						
Extra rooms						

Plot size		Built up Area	
Storey		Registration status	

5. Did you undergo any type of transformation since receiving the housing?
   a. Yes B. No (the house is exactly I have received it)
6. If "No", why?
   ……
7. If 'Yes', what type of transformation have you undertaken? (can choose more than one)
   a. External Extensions c. Internal Alterations
   b. Single Tabula Rasa d. Joint Tabula Rasa
   e. Others specify……
8. What was your intention at the time when you decided to transform? REASON
   ……
   ……
9. Where exactly inside the plot is your transformation located?
   a. At the backyard of the main house
   b. To front yard of the main house
   c. To sides of the main house
   d. It is Tabula Rasa type
10. What kind of other transformation you done on the transformed units?
    a. Change of building materials
    b. Slight renovation with the same building materials
    c. Adding floor vertically (vertical increments)

d. Adding a housing or commercial unit inside the plot

e. Demolished and rebuilt with new design and building materials

f. Nothing

11. In how many Stages/Phases was the transformation done? .....

12. Details regarding your transformation

STAGE	Year of transform	Owner (then)	Demolished Space			Added Space			Materials Used			Labor employed	Building permit Y/N	Type	Placement
			Unit	No	Area	Unit	No	Area	Wall	Roof	Floor				

13. Do you rent any or all the transformed housing?

a. Yes b. no

14. If “yes” for what purpose you rent?

a. Residence b. Commercial c. Both

15. Who many units do you have for rent purposes?

a. ……..number of residential units:

b. …….. number of commercial units

16. Who lives in the rented/ extra units that you have created?

a. Married Offspring, #⌂ b. tenants , #⌂ c. relatives #⌂

17. What is your level of satisfaction with the house you have now?

a. Excellent b. Good c. Fair d. Not satisfied

18. How were you living your lives before you started transformation?

……

……

……

19. What changes in your livelihood and living conditions did you have after transformation?

……

……

……

20. What are the advantages and disadvantages you had during or after transformation?

Advantages you gained	Disadvantages you faced

……
……
……

21. What is your plan in the future regarding the house you have now?
    a. I want to continue transforming or extending
    b. I want to stop extending
    c. I want to demolish the existing extended house
    d. I don't know
    e. Others; specify
    _____

SECTION C. DENSITY RELATED

22. How do you perceive the number of people living in this community?
    a. Small density
    b. Medium Density
    c. High Density
    D. Crowded

23. What indicators did you use to pass judgment about the crowdness of your community?

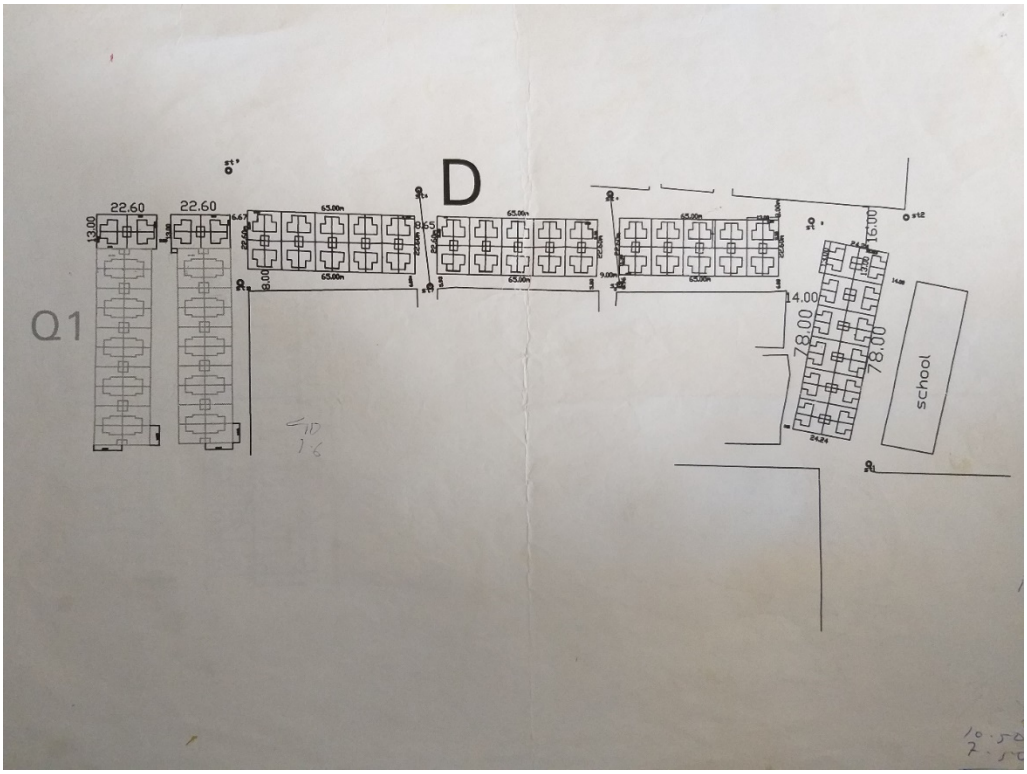
……
……

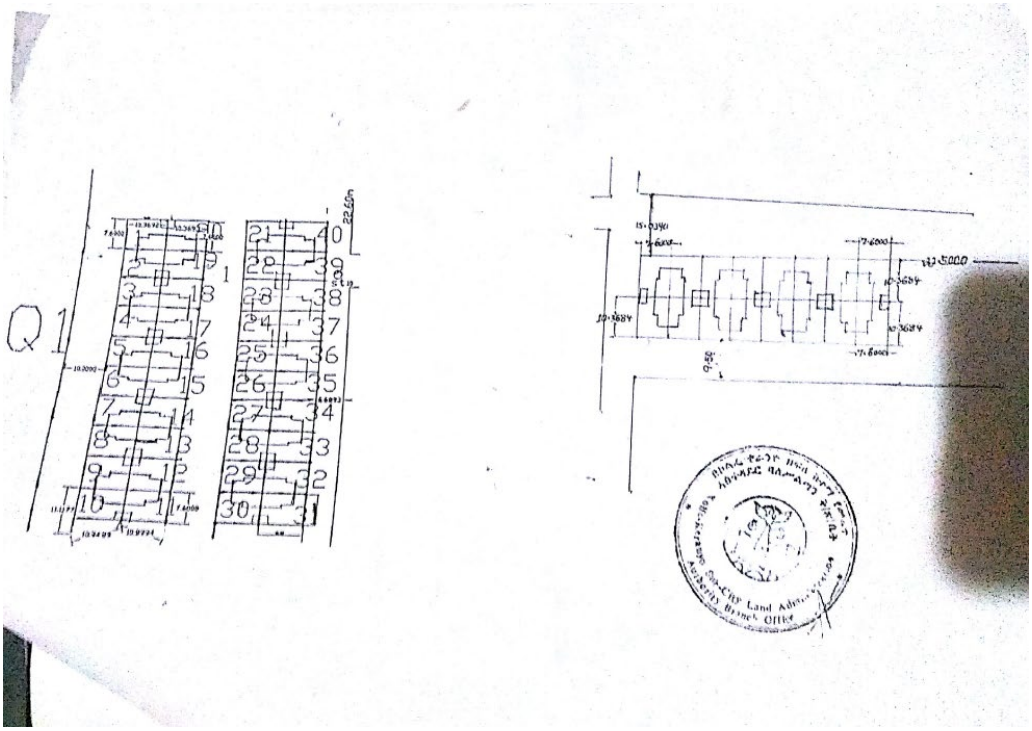
24. What do you feel about the community and residential and population density in Mekelakya Sefer? (Compare now with 10 years ago)
    ……
    ……
    ……
25. How does this density affect your daily lives in this neighborhood?
    ……
    ……

	Better off from original	Worse off from original
House		
Noise		
Roads		
Transport		
Water, Electricity		
Social interaction		
Social services		
Sanitation		

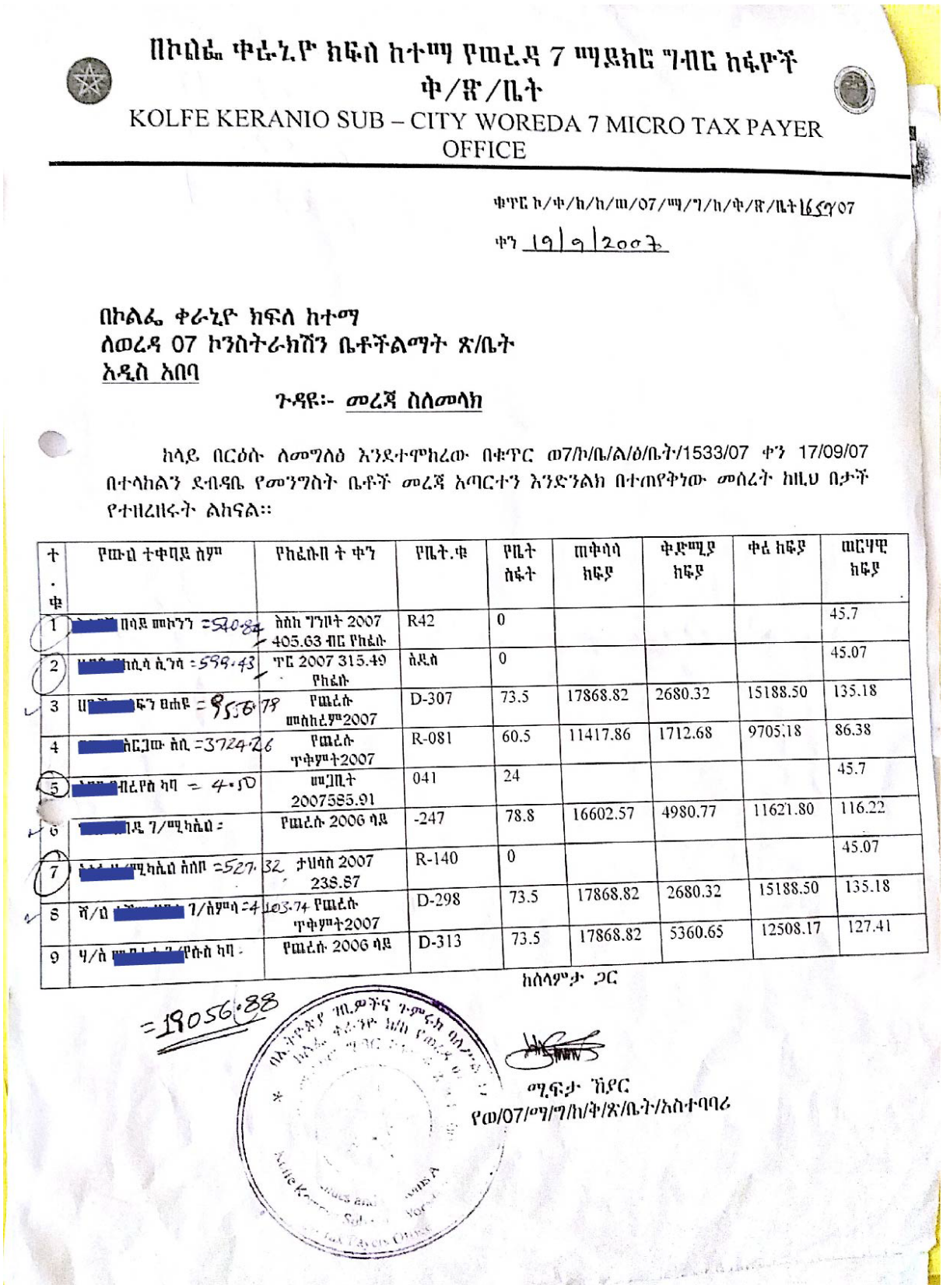
APPENDICES

Appendix 1: Archive plan of Houses given to armed force personnel





Appendix 2: Letter of privatization process of some houses



በኮልፌ ቀራኒዮ ክፍለ ከተማ የወረዳ 7 ማይክሮ ግብር ከፋዮች ቅ/ጽ/ቤት

KOLFE KERANIO SUB – CITY WOREDA 7 MICRO TAX PAYER OFFICE

ቁጥር ኮ/ቀ/ክ/ከ/ወ/07/ማ/ግ/ከ/ቅ/ጽ/ቤት/1657/07

ቀን 19/9/2007

በኮልፌ ቀራኒዮ ክፍለ ከተማ
ለወረዳ 07 ኮንስትራክሽን ቤቶችልማት ጽ/ቤት
አዲስ አበባ

ጉዳዩ፡- መረጃ ስለመላክ

ከላይ በርዕሱ ለመግለፅ እንደተሞከረው በቁጥር ወ7/ኮ/ቤ/ል/ፅ/ቤት/1533/07 ቀን 17/09/07 በተላከልን ደብዳቤ የመንግስት ቤቶች መረጃ አጣርተን እንድንልክ በተጠየቅነው መሰረት ከዚህ በታች የተዘረዘሩት ልከናል።

ተ.ቁ	የሙሉ ተቀባይ ስም	የከፈሉበ ት ቀን	የቤት.ቁ	የቤት ስፋት	ጠቅላላ ክፍያ	ቅድሚያ ክፍያ	ቀሪ ክፍያ	ወርሃዊ ክፍያ
1	[redacted] በላይ መኮንን =5240.84	ሰኔ 2007 405.63 ብር የከፈሉ	R42	0				45.7
2	[redacted]ከሊላ ሲጎላ =559.43	ጥር 2007 315.49 የከፈሉ	ስዲስ	0				45.07
3	[redacted]ፍን ወሐዩ =9536.78	የጠፈሉ መስከረም2007	D-307	73.5	17868.82	2680.32	15188.50	135.18
4	[redacted]ስርጋሙ ስሊ =3724.26	የጠፈሉ ጥቅምት2007	R-081	60.5	11417.86	1712.68	9705.18	86.38
5	[redacted]ብረየስ ካሳ = 4.50	ሰኔ2007 385.91	041	24				45.7
6	[redacted]ዴ ገ/ሚካኤል =	የጠፈሉ 2006 ሳይ	-247	78.8	16602.57	4980.77	11621.80	116.22
7	[redacted]ሚካኤል ስሰቦ =527.32	ታህሳስ 2007 238.87	R-140	0				45.07
8	ሻ/ል [redacted] ገ/ስምሳ =4103.74	የጠፈሉ ጥቅምት2007	D-298	73.5	17868.82	2680.32	15188.50	135.18
9	ሳ/ስ [redacted]የሱስ ካሳ -	የጠፈሉ 2006 ሳይ	D-313	73.5	17868.82	5360.65	12508.17	127.41

ከሰላምታ ጋር

=19056.88

ሚፍታ ኸያር
የወ/07/ማ/ግ/ከ/ቅ/ጽ/ቤት/አስተባባሪ

Appendix 3: Land management proclamation about Merging/ sub division of plots for residential purposes

የይዞታ አስተዳደር አገልግሎት አሰጣጥ መመሪያ ቁጥር 12/2004 ዓ.ም

ክፍል አራት ሕጋዊ ይዞታን ስለመቀላቀል ወይም ስለመክፈል

ይዞታን ስለ መቀላቀልና አገልግሎት ለውጥ

ከአንድ በላይ የሆኑ አዋሳኝ ይዞታዎችን ቀላቅሎ ወደ አንድ ይዞታ ለመለወጥ ሲፈለግ የሚተከሉት አጠቃላይ ድንጋጌዎች ተፈፃሚ ይሆናሉ፡፡

የሚቀላቀሉት ይዞታዎች ህጋዊ የሆነ ካርታ ያላቸው መሆን አለባቸው፤

ቴክኒካዊ የቦታ አቀማመጣቸውና የቦታው አጠቃቀም ከከተማዋ ማስተር ፕላን እንዲሁም ከማስተር ፕላኑ ጋር ተያያዥነት ካላቸው ሌሎች ፕላኖች ጋር የማይቃረኑ መሆን አለበት፤

ከሚቀላቀሉት ይዞታዎች ውስጥ አንዱ ወይም ሁሉም የተገኙት በሽያጭ፣ በስጦታ ወይም በውርስ ከሆነ የስም ዝውውሩ ቀድሞ መፈጸም አለበት፤

ነባር እና በሊዝ ስሪት የሚተዳደሩ ይዞታዎች እንዲቀላቀሉ ሲጠየቅ በሊዝ ስርዓት መሠረት የሚተዳደሩ ሆነው፤

ሀ. የሊዝ ዘመኑ የሚወሰነው በሊዝ ቀድሞ ለተገኘው ቦታ የተፈቀደለትና የተጠቀመበትን ጊዜ ታሳቢ በማድረግ አዲስ ወደ ሊዝ ለሚገባው ነባሩ ይዞታ የሚፈቀደውን የሊዝ ዘመን አማካይ በማስላት ይሆናል፤

ለ. የነባር ይዞታዎች የሊዝ ዋጋ የአካባቢው የሊዝ መነሻ ዋጋ ይሆናል፡፡

ሐ. የሊዝ አከፋፈሉም በሊዝ ደንቡና ደንቡን ለማስፈፀም በወጣው መመሪያ መሰረት ይሆናል፤

የሚቀላቀሉ ይዞታዎች በዋስትና እና እገዳ ያልተመዘገቡ መሆን አለባቸው፡፡

ማንኛውም ይዞታ ሲቀላቀል በቅድሚያ አስፈላጊውን የአገልግሎት ክፍያ መክፈል ይኖርበታል፤

የመኖሪያ ይዞታን ቀላቅሎ አንድ መኖሪያ ቤት ለመስራት በዚህ ክፍል በንዑስ አንቀጽ 18.1 የተዘረዘሩት እንደተጠበቁ ሆነዉ የሚከተሉት ሁኔታዎች መሟላት አለባቸው፡፡

የሚቀላቀሉት ቦታዎች ስፋት አጠቃላይ ድምር በአካባቢው የተጠናው ዝርዝር ፕላን በሚፈቅደው የመሬት ስፋት ሽንሻኖ መሰረት የሚወሰን ይሆናል፡፡

የአካባቢ ፕላን ያልተጠናላቸው ቦታዎች ከሆኑ የሚቀላቀለው የይዞታ ስፋት ድምር ከ500 ሜ/ካ መብለጥ የለበትም፡፡

በሊዝ የተገኙ ይዞታዎች እንዲቀላቀሉ የሚፈቀደው የተሻለ ልማት እንደሚያመጡ እና የከተማውንና የአካባቢውን ፕላን የማያዛቡ መሆናቸው ሲረጋገጥ ብቻ ነው፤

ነባር የመኖሪያ ቤቶች ሲቀላቀሉ በነባር ስሪት የሚተዳደሩ ይሆናል፡፡

እንድ መኖርያ ቤት ለመገንባት

ከሊዝ ነፃ የተሰጠን ቦታ ካቀላቀለና ስፋቱ እስከ175 ካ.ሜ ይዞታ ከሆነ የአካባቢውን የሊዝ መነሻ ዋጋ እንዲከፍል ይደረጋል፡፡

ከሊዝ ነፃ የተሰጠን ቦታ ካቀላቀለና ስፋቱ ከ175 እስከ 500 ካ.ሜ ከሆነ ለይዞታው ጠቅላላ የአካባቢውን ወቅታዊ የሊዝ ዋጋ እንዲከፍል ይደረጋል፡፡

በዚህ አንቀጽ 18.1 አን 18. 2 የተጠቀሰው አንደለ ሆኖ ተቀላቅሎ የሚፈጠረው ቦታ ከ500ሜ/ካ ከበለጠ ስሪቱ ነባርም ሆነ ሊዝ ተጨማሪው ቦታ ላይ ወቅታዊ የሊዝ ዋጋ በሁለት ተባዝቶ መክፈል ከቻለ ብቻ ይሆናል

ሁለት ወይም ከዚያ በላይ የሆኑና በጨረታ ወይም በድርድር የተገኙ ይዞታዎች ሲቀላቀሉ በንዑስ አንቀፅ 18.2.3 የተጠቀሰው እንደተጠበቀ ሆኖ ክፍያው እንደሚቀላቀሉት ካሬ ሜትር ቀሪ የሊዝ ዋጋ የተመዘነ አማካይ /Weighted Average/ ይሆናል፡፡ ቀሪ የሊዝ ዘመኑ የሚወሰነው በውሉ መሰረት ለጨረታውና ለድርድር በተቀመጠው የቀሪው የሊዝ ዘመን አማካይ ጊዜ ይሆናል፡፡

በማህበር ተደራጅተው ለጋራ መኖሪያ/በኮንዶሚኒየም አግባብ ከአንድ ቤት በላይ ለመስራት ታስቦ የተሰጠን ቦታ ከውሉ ውጪ ከተጠቀሰው ቁጥር በታች ቀላቅሎ መስራት የተከለከለ ነው፡፡ ነገር ግን ከተፈቀደላቸው ቁጥር ቤት በላይ ለመገንባት ሲፈልጉ የዲዛይን ለውጥ አድርገው ሲፈቀድላቸው ተጨማሪ ቤት መገንባት ይችላሉ፡፡

የመኖሪያ ቤት ይዞታን ቀላቅሎ የድርጅት ወይንም ለተናጠል ይዞታው ከሚጠበቀው ቁጥር በላይ የመኖርያ ቤቶች ግንባታ ለማካሄድ ሲፈለግ በንዑስ አንቀጽ 18.1 የተጠቀሰው እንደተጠበቀ ሆኖ፣

ነባር ይዞታ ከሆነ የሚፈቀደው የቦታ ስፋት በአካባቢው ፕላን መሰረት እንደ ልማት ዕቅዱ /ፕሮፖዛል/ እየታየ በማስተባበሪያ ፕሮጀክት ጽ/ቤት ኃላፊ የሚፈቀድ ሆኖ በነባር ስሪት የሚተዳደር ይሆናል፡፡

የሚቀላቀለው ይዞታ የመንገድ ፊት ለፊት ገፁ /Frontage/ ድምር ከ150 ሜትር በላይ መሆን የለበትም፡፡

ከሊዝ ነፃ የተሰጠን የመኖሪያ ይዞታ ቀላቅሎ ወደ ድርጅት ሲቀየር ቦታው በሚቀላቀልበት ጊዜ በሚገኘው በወቅቱ የአካባቢው የሊዝ መነሻ ዋጋ ይስተናገዳሉ፣ አፈጻጸሙም የከተማ ቦታን በሊዝ ስለመፍቀድ በወጣው የሊዝ አፈጻጸም መመሪያ ቁጥር -----2004 እና የሊዝ ደንብ መሰረት ይሆናል፡፡

የመኖሪያ ይዞታ ወደ ድርጅት ሲቀየር የቦታው ቀሪ የሊዝ ጊዜ በሊዝ አዋጅ መሰረት ለድርጅት /ለአገልግሎት ዘርፉ/ በተቀመጠው መሠረት ይስተናገዳል፡፡

በሊዝ የተያዙ ሁለት እና ከዚያ በላይ የሆኑ ይዞታዎች ሲቀላቀሉ የተለያየ የሊዝ ዋጋ ከነበራቸው ቀሪው የሊዝ ዋጋ በቦታዎቹ በተመዘነ አማካይ የሊዝ ዋጋ/ Weighted Average/ መሠረት ሆኖ የሊዝ ዘመኑ የሚሆነው የተቀላቀሉት ይዞታዎች ቀሪ የሊዝ ዘመን ተደምሮ የሚገኘው አማካይ ውጤት ይሆናል፡፡