

# EXTENDED ABSTRACT

## MUSSUS

Guidelines For The Inclusion Of  
*Musekes* In Luanda

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### i. ABSTRACT

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The present dissertation consists in the conception of a social housing programme for the city of *Luanda*. The main goal is to create guidelines to improve the conditions of exclusion of slums, bringing awareness to contemporary ideologies– sustainability and modularity in architecture – and lifestyle choices – such as self-sufficiency, voluntary work and maintenance. People in slums build their own houses, in order to overcome financial shortages, but the construction processes lack the crucial knowledge that guarantees safety and acceptable living conditions. The **MUSSUS** Programme aims at contributing to this knowledge, creating a module that adapts to the *musekes* identity and individual needs. The houses' design is made through a schematic modular and standardised system, which is adaptable and can be enlarged, and uses strategies of passive design. In the *museke*, one frequently finds that there is little care for the maintenance of home. The house is seen as a provisional place before achieving a better future and is therefore underappreciated. It is particularly important to set an emotional link between the **MUSSUS** archetype and the people themselves, upcoming owners, otherwise the risk of neglect would remain the same. So the **MUSSUS** concept is established by a standard modular archetype to enable people's participation in the design and creation of the house.

### 0.0. INTRODUCTION

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Home is a place of our own, where we live in family, feel safe and comfortable. However, there are millions of people struggling to live in adequate conditions worldwide. Mainly in under-developed countries, this problem affects the continents of South East Asia, South America and Africa.

This dissertation discusses the issues of excluded urban areas in the metropolis of developing countries, focusing on the Sub-Saharan capital of Angola, Luanda. The theme equally explores the 3S's concept in Architecture – Social, Sustainable and Standard solutions – aiming to develop a Social Housing Programme – MUSSUS - that empowers the refurbishment of slums in Luanda, responding to different families' needs and, producing sustainable, self-sufficient and standardised houses, considering environmental needs and low-budget costs.

# 01. FRAMEWORK

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## 1.1. THE ARGUMENT SLUMS A WORLDWIDE ISSUE

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In the developed world we are currently living in the most prosperous period in human history, as society overcame basic problems through Industrialisation and Technology. The quality of life improved by the decrease of death rate associated with sickness and starvation. This progress allowed mankind to thrive but other concerns emerged in the process, such as Overpopulation. Today, more than 90 percent of this urban growth is taking place in the developing countries. Slums are also a result of bad governance, which often fails to recognise the rights of the less fortunate, and incorporate them into urban planning; hence, contributing to the growth of slums.

The growth of slums in the Sub-Saharan Africa is far greater than other world regions. All solutions are welcomed – responding to different cultures and different ways of living - the objective of this study is *Luanda*, the capital of Angola.

## 1.2. ANGOLA IDENTITY OF A NATION

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In 1482, the Portuguese navigator *Diogo Cão* encountered the rim of Congo, then contacted the largest *Bantu* Kingdom of Central Western Africa: the *Kingdom of Congo*. For centuries before that, the known inhabitants to occupy the current land of Angola were mainly *Bantu* indigenous groups. Portuguese colonisers remained mostly in coastal areas; the city of Luanda was established as one of the most important commercial trade ports. The increasing occupation of the land by the Portuguese fuelled an emerging independence movement. Angola became independent in 1975, after 13 years of military conflict (1961-1974); as a result things were left unstructured. Since the civil war, there has been peace and political stability. The Angolan government has a financial autonomy that came from access to oil, managing to maintain an impressive average annual real GDP growth rate of 11.6 percent. The dependence on the oil's international valorisation created a false sense of security, since its de-valorisation developed an immediate economic crisis.

The 40 years of colonial and civil wars in Angola impacted the actual demographic structure of the country. A large part of the population was forced to leave their areas of origin, causing migration from rural areas to urban, resulting to a drastic population growth in cities. The capital Luanda was the most pursued option (MINUA, 2006: 2c p1). In addition to being the province with the highest number of inhabitants [27% of the total population], Luanda is also the city with the highest population density with 347 inhabitants per square kilometre, this due to its small territorial size [18,834 km<sup>2</sup>] (INE, 2014 : 31).

*“The unruly urban growth associated with the population displacements caused great pressure on the existing infrastructure, accentuating the phenomenon of poverty.” (cit. in MINUA, 2006: c2 p2)*



F\_01 Map of Angola and zoom in of Luanda.  
[s: Author adapted from GOOGLE EARTH]

The extended civil conflict contributed to the occurrence of economic distortions, a fact which was reflected negatively in the emergence of new investments, the stagnation of existing companies and the bankruptcy of thousands of small and medium enterprises; which are fundamental in generating employment and income for the society. This environment created a severe imbalance in job search. In this context, the formal unemployment rate is high in Angola. The quality of hand labour is low and the technical knowledge level of the vast majority of the working masses is not to standard. The distortion of the labour markets, low wages, job insecurity and unexperienced work force resulted to impediment on the development (MINUA: c2 p36).

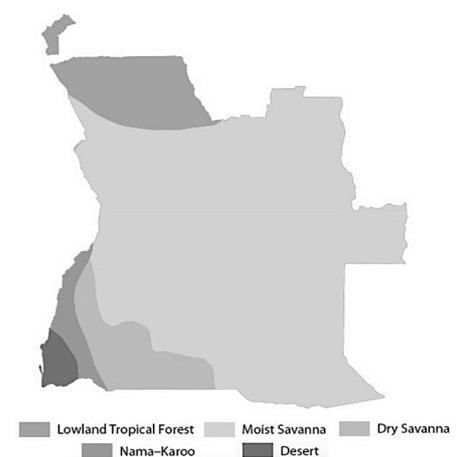
Angola is a country with strong agricultural potential, owning huge tracts of arable land; able to cultivate sufficient crops to support the production of food and sustain the population as well as being able to export in exchange of financial benefits. Because of the war, agricultural production levels dropped to the point that are insufficient to cover the minimum needs of the population. Especially in the urban area, where consumption is highly dependent on imported goods; such as cereals, edible oils, flour, milk and dairy products. There are three main agroecological zones corresponding to the main climatic and geographical features of the country (MINUA, 2006).

1. **North** – humid climate;
2. **South** – semi-arid and dry;
3. **Central High-land** – intermediate sub-humid climate.

In the context of the International Year of Family Farming [IYFF], the Government of Angola, took the initiative in promoting family farming as a means of reducing famine; overcoming food insecurity and reducing poverty (FAO, 2014 : 6). The revitalization of Agriculture is a first step to solve the problem of Slums, calling many of its inhabitants back to their original areas, before the war. The allure for rural lifestyle must be developed in order to bring the dislocated population back in the refurbished home villages where the quality of life is much improved.

### 1.3. TERRITORIAL ANALYSIS

*Luanda* is located in the North Western part of Angola, bathed in the West by the Atlantic Ocean and making North land border with the Northern *Bengo* Province, to the West with *Kwanza Norte* Province and the South and Southwest with *Kwanza Sul* Province. It is the second smallest city of *Angola*, with a land area of 18,826 km<sup>2</sup>, which represents 1.51% of the national territory extension (PDPL, 2014 : 15).



F\_02 Map of Angola Climatic Regions.  
[s: Author adapted from MINUA]

## **COLONIAL period**

The Age of Discovery is initiated by the Crown of *Portugal*, followed by Castille, and later enlarged to the remaining European countries. In the preface of *“Colonialism: A Theoretical Overview”*, Osterhammel [1997] defines Colonialism as *“a relationship between an indigenous majority and a minority of foreign invaders (...) the lives of the colonized people are made by the colonial rulers for a distant metropolis interest. Rejecting cultural compromises, the colonizers are convinced of their own superiority (...) to rule.*

Before independence, the colonised countries followed a mercantilism<sup>1</sup> policy, and its territories were used mostly as the means to a commercial purpose. The provinces were not developed to achieve self-sufficiency and fuel themselves, rather were developed to obtain maximum profit for the holder’s main countries.

### **1575**

*“São Paulo de Loanda was founded by Paulo Dias de Novais, its destiny was to be the capital of the Kingdom, due to its privileged location between two major watersheds, rivers Bengo and Kwanza.” (cit in BATALHA, 2006: 7).*

### **1700’s**

According to author Correia (2012), from 1647, the city was defined by a spontaneous layout, elaborated by settlers who followed the patterns of medieval Portuguese cities. Luanda already had a few urban elements, such as the numerous wide squares that promoted ventilation throughout the city. The city was developing with a defensive and commercial character, in a perfect adaptation to the local topography, rugged and composed of two distinct zones that complemented each other: the *“Cidade Alta”* [upper-city], the governmental and defensive functions, and the *“Cidade Baixa”* [downtown city], the seaport and commercial functions (FERNANDES, 2005 : 29).

### **1800’s**

The Industrial Revolution, in the mid-1800’s settled the transition from a world moved by an agriculture based economy to an industrial, mechanized one. The housing production in particular - became faster, more appealing and cheaper - was building continuously - what is now described as modular architecture<sup>2</sup> - and therefore cities grew unprecedentedly. Despite the favourable times this movement also brought its misfortunes. The Industrialisation in urban cities attracted more immigrants, overpopulating the inadequate existent infra-structure, arising the first slums.

### **1940’s – 1950’s**

*“Luanda was a (un)predictable colonial city, characterised by an increasing social exclusion, fuelled by a search for a better life and the proliferation of its musekes. The constructions were spontaneous and self-built, located in or around the asphalt town )NETO, 2000 : 42).*

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<sup>1</sup> Mercantilism is a national economic policy designed to maximize the trade of a nation. [LaHaye, The Concise Encyclopedia of Economics : 2008]

<sup>2</sup> Concept later elaborated on Chapter 2.

The Luanda's Urban Plan of 1942, created by Étienne Groer and David Moreira da Silva, was highly influenced by the theory of Howard, "The Garden City", proposing the satellite cities strategy (MARTINS, 2001 : 265). According to Martins (2001 : 265) the model has a radial design, with polycentric connections - which are used as the main input and output streams - from the city centre to the new peripheral cores. This composition intention is to flow the population from the centre, pulling them to outside centralities, and turning them consequently into dorm-cities.

"The urbanised city began a rapid expansion through tentacles that penetrate the various blocks of the slums who were forced to retire to increasing distances" (AMARAL, 1968 : 15).

**POST-COLONIAL period amidst civil conflicts**

**1975**

Angola acquired its independency in the 11th of November. The insufficient formal mechanisms of the urban fabric and the increasing flow of rural population to the city, encouraged a rapid expansion of the informal market, and Luanda faced an increase on its *musekes*.

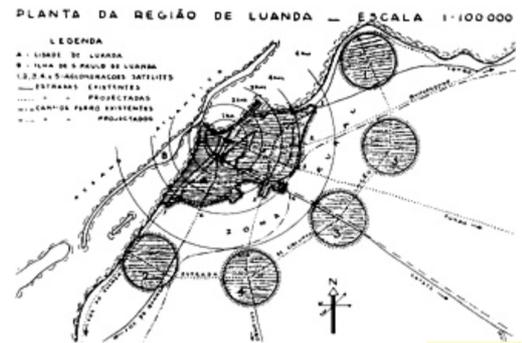
**1990's**

According to the Development Workshop (2005), the difficult management of informal peri-urban settlements in Luanda also undermined the administration of the urbanised city. The public networks were saturated; sewerage, water and power supply systems were vandalised, public funds were being embezzled, green areas and existing infrastructure were being uncontrolled occupied. The decade of civil conflicts to come would worsen the scenario (VIEGAS, 2012 : 9-10).

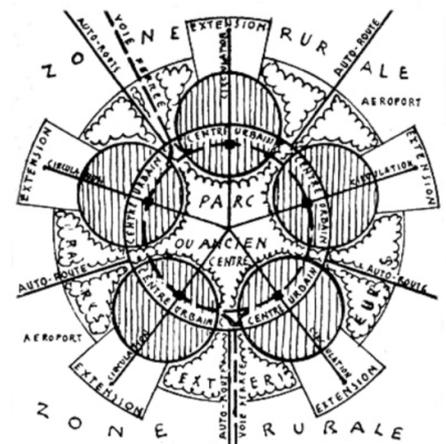
**POST-COLONIAL period amidst peace**

The end of the civil war in 2002, brought hope on a long-awaited future, and the chance to create a advanced social and urban structure. Nonetheless little was invested in a sustainable guidance between the society and the territory, and all innovative social programmes have been clearly insufficient.

The discriminatory nature of the colonial system determined for African cities a dual morphology for African cities, based on an urbanised nucleus is surrounded by temporary unplanned bands in precarious conditions (OPPENHEIMER & RAPOSO, 2007 : 67). According to Amado (2003 : 13), the Luanda's rhythmic development forms the "emergence of two different entities - impending yet not integrated - characterise the peripheralization, resulting from the processes of densification of the urban centre and adjacent areas." In his opinion, "the peripheralization, specifically in Luanda, has a generating force dismissing the new low-income migrants to areas closer to the centre". This is due to the provision of improved urban infrastructure and social equipment - located in the centre - which will further reflect in the crystallisation of social inequalities (OPPENHEIMER & RAPOSO, 2007 : 52).



F\_03 The Luanda Masterplan of 1942 by Etienne Groer [s: FONTE, 2007]



F\_04 The Garden City Theoretical Model by Etienne Groer [s: FONTE, 2007]

In a world where dispersed settlements patterns are encouraged, this requires people to make many journeys and use public transportation (A GREEN VITRUVIUS, 2001 : 51). Car-oriented town planning is not sustainable, cars produce congestion and pollution, thus leading to health problems and economic losses, since much valuable time is lost in traffic. This process have colonised the public realm, depriving open space of human scale and effectively dehumanising entire communities. Forward-looking planning encourages transport-conscious strategies, that consists that the daily activities are at reach of walking or bicycle distance (RUANO, 199 : 13).

Land tenure is the right of an individual or group to occupy or use a piece of land. Inner cities complex mobility can result in illegal constructions in order to remain in urban centres. People who are safe from eviction have a sense of long-term stability—whether they own the land or not—are much more likely to invest in their housing or community. Regarding the land tenure security, it can be concluded that much of the population has access to it, through informal mechanisms, but feel relatively safe with that possession (BETTENCOURT, 2011 : 72).

#### 1.4. MUSEKE THE ANGOLAN SLUM

In *“The Challenge of Slum-Global Report on Urban Settlements”* (2003), UN-HABITAT defines “slum” as “a wide range of low-income settlements and/or poor human living conditions.”

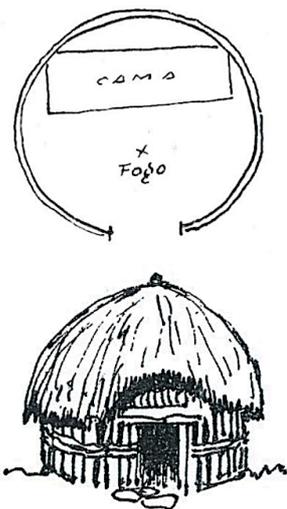
*museke* [kimbundo] is the name given to the reddish argillaceous sand embodied in Luanda. This is in referenced to the boundaries of the city, for not having paved streets, as referred by the writer *Pepetela* on his *“Luandando”* book.

*“The museke is closed in a complex interlacing and organic alleys, small squares and corridors. The streets are as narrow as passing spaces with a persons width. Unaware of any planning, responding solely to pedestrian access needs, to the most recondite places in the museke’s heart. The chaotic configuration, favoured the formation of a place with identity and charisma.”* (QUELHAS, 2006).

Sanzala is the name given to rural clusters of houses in Angola. Its organic formulation is the way its inhabitants considered being the culmination of living in society. The clusters that form the *sanzala* are *Cubatas*; which is constructions of narrow wooden sticks structure, covered by adobe and clay (FONTE, 2007 : 13). The phenomenon of rural migration, due to the civil war, led the population to carry the only constructive and urban knowledge they had - *cubatas* and *sanzalas*. In association with the lack of economic capacity, it’s proper to understand how musekes developed. *“In the slums of Luanda is possible to find references to sanzalas, the cubatas are arranged as a group in the territory, forming a unit with a patio space facing the housing.”* (FONTE, 2007 : 14).

Although all of the social transformations that the population of Luanda was subjected to, which changed its *“modus vivendi”*, it is clear to observe that several ancestral values are still preserved and applied in the dwellings in popular neighbourhoods like *Bairro Operário* (ALEXANDRE, 2016 : 77).

F\_05 Cubata Plan and elevation..  
[s: FONTE, 2007] [s: ALEXANDRE, 2016]



## 02. SUSTAINABLE MODULAR SOLUTIONS

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### 2.1. BIOCLIMATIC DESIGN

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**Location:** Southwest coast of Africa bathed by the Atlantic Ocean in the West. The Angolan climate is classified as sub-tropical, hot and humid in most of the territory, with a semi-arid and dry sub-humid zone in the south and on the coastal strip up to the Province of Luanda (GUEDES, 2012 : 13).

In developing countries, if future energy demands are to be sustainable and affordable, alternative approaches that promotes energy efficiency need to be embraced (KOCH-NIELSEN, 2002 : 13). Passive design measures rely on utilising the elements inherent in a region's climate and its natural energy sources, reacting to seasonal changes, accepting the dynamics of the nature (KOCH-NIELSEN, 2002 : 15).

The urban design objectives for the climatic characteristics of Luanda are;

The house layout when laid out in a grid, spacing of six times a building's height will ensure air movement (KOCH-NIELSEN, 2002 : 120). In regions where overheating is a priority issue, a southerly orientation to the north is recommended. The use of porches should also be considered in order to prevent direct solar radiation falling directly on the external walls. The bedrooms when oriented to the east have cooler spaces, due to indirect solar exposure. The kitchen space which should be the coolest in the house, cannot be oriented north. Planting near the façades, or even cladding façades with vegetation elements, increases internal comfort, and acts as a filter for solar rays (GUEDES, 2014 : 440).

### 2.2. 3S's BUILT EXAMPLES

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#### 2.2.1. SOCIAL HOUSING SOLUTIONS

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In "*Housing the Poor in African Cities; Low Income Housing, Approaches to Helping the Urban Poor Find Adequate Housing in African Cities*", UN-HABITAT defines approaches to low-income housing in improvement of physical, social and economic environment of an existing informal settlement, without displacing the people on-site.

#### 2.2.2. STANDARDISATION MODULAR CONSTRUCTION

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In the French reconstruction, proportions and modules, became a central issue, as architects struggled amid changing procedures in building production. Modularity means using the same module in multiple configurations enabling a large variety of designs without using many component types. This brings several advantages such as reduced capital requirement, especially with large scale projects. Through modularity, you can achieve various designs – **adaptability** - while achieving **fast construction** for development, as well as, **cost saving** in design and construction (NADY, 2015).

### 2.2.3. SUSTAINABLE MODULAR CONSTRUCTION

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Today, architecture has an ethic imperative to help solving world-wide severe problems like global warming, poverty, mass migrations and overpopulation. The urge for sustainability has changed the modern perspective in a new age exigency for and self-sufficiency. Designing according to nature, and to social-economic context, is seen as something for humans to value.

## 03. THE MUSSUS PROGRAM

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The **MUSSUS** [**MUSEKE + SUSTAINABLE = MUSSUS**] programme embodies the social housing and urban renewal urgency required in the city of Luanda, Angola. The ideology stems to embrace the community needs and prospects, regarding environmental and economic issues in addition to contribute to a self-sufficient way of building. Adopting the combined concepts of social housing, modularity and sustainable architecture, that can lead to the transformation of slums in Luanda.

Therefore, in order to achieve those goals, the MUSSUS Programme principles are;

- **To create a module**, that can multiply, adapt and modify embedded in a standard construction, that contemplates the process of spatial evolution. To use passive methods and materials, to reduce the environmental impact.
- **To create an intermediary instrument**, through self-manipulation, that can turn a concept into matter – the MUSSUS form.
- **To create a movement** of mutual aid practices. A sustainable and self-sufficient mindset that would promote, recycling and maintenance into rehabilitation. Integrate professionals and any expert that can improve the process and experience.

## 04. FIELDWORK

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The visit to the Rehabilitation Centre of *Sambizanga* allowed an insight on the practices done currently, by the Government of Angola, to control the actual urgent state of the *musekes* in Luanda. The solutions being implemented by the GTRU are motivated by relocating the people living in *musekes* to new centralities – township settlements. The problems related to the township settlements were addressed in a previous chapter [1.3.2], but the study accomplished by the *Development Workshop* is from 2005, and currently these centralities are better equipped with services, and improved road network systems. However, it's great distance to the urban centre maintains the mobility issues concerns. To conclude, despite of sharing many of the obstacles, the orthogonal layout of regular *musekes*, facilitates the concept of in-site rehabilitation, on the opposite, the irregular *musekes*, which organic layout presents greater issues related to accessibility, circulation and urban density, that would demand a higher amount of demolition and planning in the process of rehabilitating the current structure. For that, both cases require different approaches, that are further developed in chapter [4.3].

## 05. CASE STUDY ANALYSIS

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According to the Urban Rehabilitation Office of *Sambizanga* and *Cazenga*, the first phase of the restoration process of *musekes* is the registration of houses and families and the **MUSSUS** programme defends this process. However, the **MUSSUS** programme also aspires to promote in-site slum upgrading, so idealistically would not follow - the remaining steps of the governmental actions - of relocating the people to township settlements. The regular *musekes* of *Bairro Operário* represent one of the greatest potential for in-site slum upgrading, in Luanda, since already displays its streets in a orthogonal urban layout.

The difficulties experienced in the house are consequences of the neighbourhood's structural problems, such as the scarce distribution of piped water, the constants electricity failures and a faulty sewage system. With the introduction of these indispensable systems, 50% of neighbourhood rehabilitation is guaranteed, empowering the population to contribute with the rest. At the beginning of the **MUSSUS** programme simulation process with the *Fragoso* family.

According to *Bento Soyto*, architect responsible of the *Urban Rehabilitation Centre of Sambizanga*, this kind of programme - **MUSSUS** - and project - *Fragoso* family house - would be single relevant to regular *musekes*, that are prone to be rehabilitated with more dexterity, since they do not display serious structural problems, when compared to irregular *musekes*. However, it would be advantageous to apply the **MUSSUS** programme to *musekes* outside the capital of Luanda, since the lower population density recorded in the provinces, guarantees more effective results.

The **MUSSUS** programme supports that the solution to improve the populational density crisis of irregular *musekes* - which is higher than the regular *musekes* - is to develop several vertical constructions. As verified by the Rehabilitation Centre in *Sambizanga*, vertical constructions compensate for the lack of public and private space in the urban layout of irregular *musekes*, which affects the ratio inhabitant per km<sup>2</sup>.

The block is divided into sub-blocks, housing 3-4 vertical housing units, with the limit of 4 floors per building, for the same reasons defined previously by the GTRU. The 1<sup>st</sup> floor and half of the 2<sup>nd</sup> floor form an apartment (up to < 6 bedrooms), the other half of the 2<sup>nd</sup> floor and the 3<sup>rd</sup> floor form another apartment (up to < 6 bedrooms, and occasionally 4 bedrooms). The programme proposes to lay the structure, building about 1/3 to 2/3 of each apartment, relying in an evolutionary system.

Trough Autodesk Revit, precisely ECOTECH, it was generated an energetic analysis report revealing the energy consumption of the construction. According to the results it was corroborated that the cooling systems presented by the perforated walls, demanded less use of active design techniques, such as air conditioning.



F\_06 Bairro Operário Simulation House Render [s: Author]



F\_07 Rangel Simulation House Render [s: Author]

## 06. CONCLUSION AND FURTHER WORK

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The purpose of this dissertation is to analyse excluded spaces – *musekes* - in the urban fabric of *Luanda*, and to create guidelines that, in theory, can unite the city as a whole. The current Angolan reality is marked by years of military conflicts, which resulted in a great rural exodus to the capital, which defined the actual informal urban areas of *Luanda*.

**To transform the *musekes* is to alter urban faulty connections.** The slums in *Luanda* should be a major concern for the Angolan Government. Solutions for the slums are currently being implemented, however they are not being fast and effective enough to tackle the problem in its urgency and magnitude. The country is in need of unconventional ideas to complement this process. **To upgrade housing in *musekes* is to cultivate new concepts.**

The **MUSSUS** final testimony is the re-definition of the *musekes*, allowing people to be involved in the conception of their living space, humanizing the importance of their homes. This process will bring new ideas, new design solutions, inspiring new space configuration and a tangible recommendation plan to existent structures in *Luanda*, and possibly *Angola*.

### ii. BIBLIOGRAPHY

- AMADO, F. (2003) *Dinâmica do crescimento populacional em Luanda*, in Amado e Munamoha, *Dinâmicas populacionais em Luanda e Maputo, Relatório de especialidade 1*, Lisboa, Centro de Estudos sobre África (CEsA / ISEG / UTL).
- ARIMAH, Ben C. (2011) *Slums as Expressions of Social Exclusion: Explaining the Prevalence of Slums in African Countries*, UN-HABITAT - United Nations Human Settlements Programme.
- BOLDEN, Johnny, ABU-LEBDEH, Taher and FINI, Ellie (2013). Utilization of Recycled and Waste Materials in Various Construction Applications, *American Journal of Environmental Sciences*, Science Publications.
- DEVELOPMENT WORKSHOP (2005) *Centro para o Meio Ambiente e Assentamentos Humanos Terra - Reforma sobre a terra urbana em Angola no período pós-guerra: Pesquisa, advocacia e políticas de desenvolvimento, Luanda: DW e CMAAH.*
- GUEDES, Manuel Correia. (2014) Chapter 16 - *Sustainable Architecture in Africa*. SAYIGH, Ali, *Sustainability, Energy and Architecture, Case Studies in Realizing Green Buildings*, AP Edition.
- KOCH-NIELSEN, Holger. (2002) *Stay Cool 'A Design Guide For The Built Environment In Hot Climates'*, Earthscan Edition.
- LOPES, Carlos M. (2007) *Acumulação, Risco e Sobrevivência na Economia Informal: Os Candonqueiros de Luanda, Cadernos de Estudos Africanos.*
- MAJALE, Michael. (2011) *Graham Tipple and Matthew French, Un-habitat - Affordable Land and Housing in Africa.*
- MINUA (2006). *Relatório do Estado Geral do Ambiente em Angola*, Programa de Investimento Ambiental, Ministério do Urbanismo e Ambiente, Governo de Angola.
- OPPENHEIMER, Jochen; and RAPOSO, Isabel. (2007) *Subúrbios de Luanda e Maputo*, Edições Colibri.
- UN-HABITAT.(2003) *The Challenge of Slums—Global Report on Human Settlements*, Routledge.
- UN-HABITAT (2012) *Streets as tools for Urban Transformation in Slums - A Street-Led Approach to Citywide Slum Upgrading*, Routledge.
- WATERSPARK – Luanda, Angola, available on: <https://weatherspark.com/y/74193/Average-Weather-in-Luanda-Angola-Year-Round>

