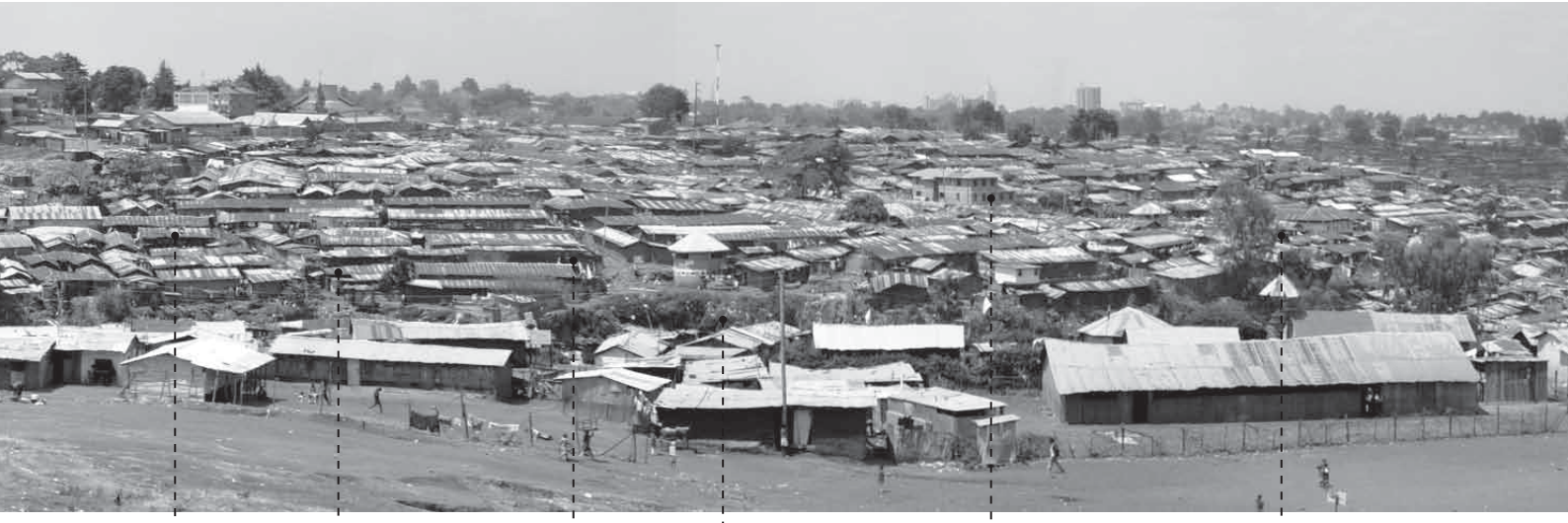
Improving Informal Settlements

-Kibera: using and developing existing knowledge

Emma Engleson | Master thesis at Chalmers Architecture | Architecture and Urban Design
January 14th, 2011 | Examiner: Ana Betancour



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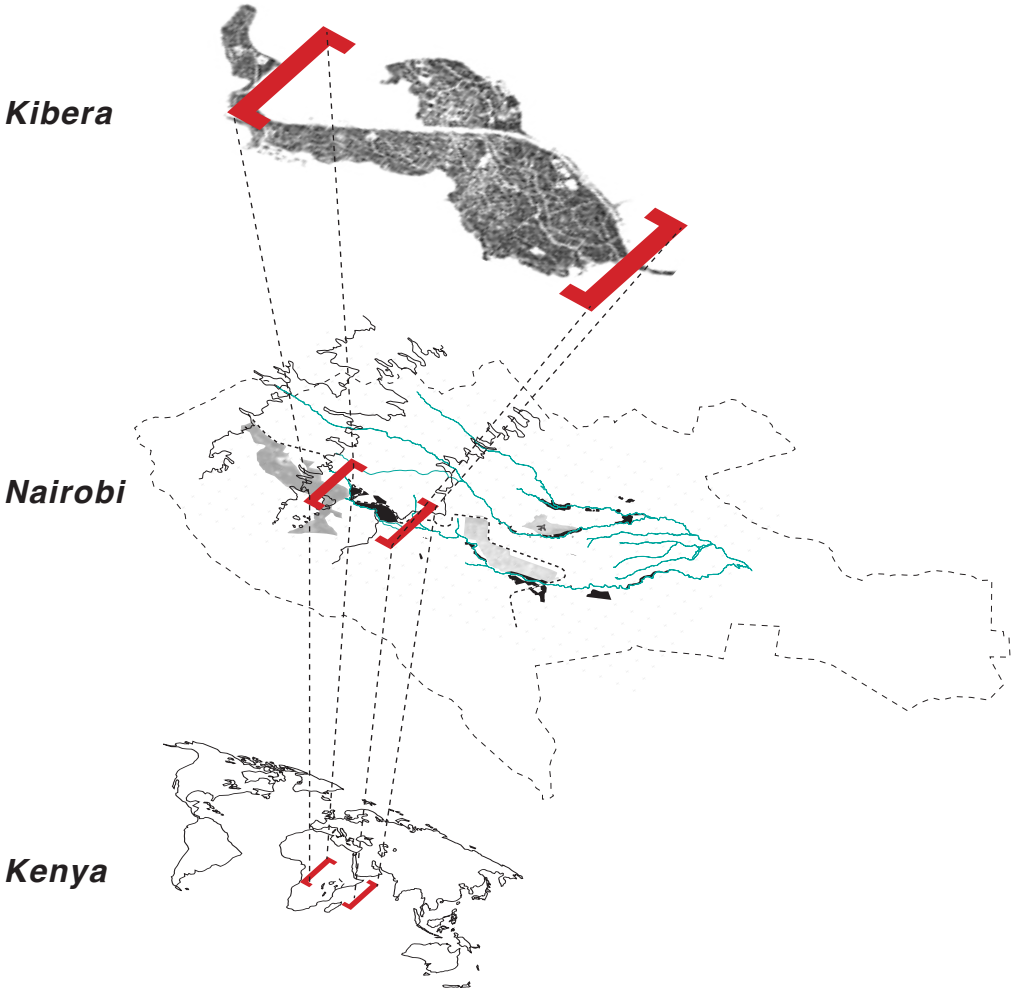
Kibera
Nairobi
Kenya

Summary

Today 20% of the world's population lives on 80% of the planet's resources. This results in growing inequalities - forcing people in "developing" countries to migrate to cities in search for income. In the cities the only affordable housing option for many people is in the informal settlements, one of the fastest growing urbanities in the world.

Informal settlements, also described as "slums", have many definitions, but the most commonly used by UN-HABITAT, the UN agency for human settlements, is:
"...a contiguous settlement where the inhabitants are characterized as having inadequate housing and basic services. A slum is often not recognized and addressed by the public authorities as an integral or equal part of the city."

Kibera is one of the most well known informal settlements in the world, located in Nairobi, the capital of Kenya. The settlement has approximately 170 000 inhabitants that live on an area of 2,5 square kilometers. Kibera's population is diverse with people from different ethnic- and income – groups organized in "villages" that have different characters.

This project presents a program for improving the infrastructure in informal settlements, with Kibera as a case study. The program is a response to the current situation and based on community participation and ecology. The objective is to create community independence and strengthen the identity.

The design program for this project aims to solve the problems working with the current qualities in Kibera. Traditional knowledge and interventions that have proven to be successful are modified and re-used to complement each other. This creates an infrastructure that is based on the local culture, creating a possibility for the community to improve with minimal foreign involvement.

Acknowledgments

I would like to thank my mentors Ana Betancour, Carl-Johan Vesterlund and Mateus Pozar for advice and support.

Thanks to Pernilla Hagbert, Katarina Bäcklund, Linda Heiman, Per Blomqvist, Marika Pawlus, Anna Olsson, Brenda McKenna, Gloria Alcázar Willis, Kristina Brissman, Agnes Ogana, Joshua Kaiganaine, Kevin Otieno, Francis Omondi Omboughr, Jossy Materu, Jane Bisanju, Mikel Maron, Primož Kovacic, Ingrid Engleson, Sten Jansson, SIDA and Chalmers master card.

Special thanks to Olle Lewis and Malena Gyllenhak for help and friendship.

Purpose & Method

The purpose of this thesis is to give a proposal of how an informal settlement can be improved with respect for local traditions and culture that will strengthen the community.

My method has been through research, learning about the forces shaping informal settlements and field studies. Through drawings, photos and models I have gained an understanding for the living patterns and scale of Kibera, which have resulted in a proposal.

I lived in Nairobi for six months, and during that time I was also involved in the project “Map Kibera”. I did an internship at UN-HABITAT and visited Kibera several times.

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"How can living conditions be improved for the millions of people densely packed into cities without destroying the natural resource base on which improved living standards depend?"
(UN-Habitat 2003, pp. xxxi)

1.0 Informal Settlements

Informal settlements are often described as "slums", which have many definitions, but the most common by the UN-HABITAT is:

"...a contiguous settlement where the inhabitants are characterized as having inadequate housing and basic services. A slum is often not recognized or addressed by the public authorities as an integral or equal part of the city."

Informal settlements have many characters, but what they all have in common is that they are illegal and have inadequate housing and services.

Informal settlements are the free market´s provision of low-cost housing (Olima 2001). The settlements are a lucrative business, where cheap housing, not following building codes and regulations, and without adequate infrastructure, can be built. Without any cost for maintenance and infrastructure buildings rapidly become income sources with no expenses. Kibera is said to generate approximately 640 000 Euro per Month (Marras 2009).

Important to remember is that informal settlements are not only a place to live, the areas also provide opportunities for income generating activities in the informal economy, which is linked to the formal economy and the developed countries economic growth (Olima 2001).

Definition and Characteristics

Informal settlements appear in many different ways, both physically and socially. The appearance is prerequisite by the local conditions such as; culture, history, politics, topography and the built environment.

Challenges that most informal settlement have in common are overcrowding, access to sanitation, access to clean water, poor structural quality of housing and security of tenure (UN-HABITAT 2003).

Informal settlements are commonly referred to as slums, shanties, squatter settlements and informal housing (UN-HABITAT 2003). “Slum” is a loaded term, often depicting decay, dirt and diseases. The word is an English term originated from outsider’s belief of what the neighborhood is like (Neuwirth 2006). “Squatter” are a term used for people building homes on land they do not own (Neuwirth 2006). “Informal” indicates that something is not officially recognized or controlled. This is a term that can apply to all of these neighborhoods and is less disrespectable than the term “slum”. “Informal settlements” is used in this report.

History of Informal Settlements

Ever since there have been cities, poor neighborhoods have existed, but it was not until the 1820s that the notion of informal settlements was established, this was probably because the conditions improved and it was possible to distinguish informal settlements from other parts (UN-HABITAT 2003).

Informal settlements were widespread in developed, western countries during the Industrialization. With the fast urbanization housing was needed. The early capitalism change urban planning traditions to less focus on open space and common grounds. With the Industrial Revolution advanced transportation made it possible for privileged to separate themselves from poor. These spatial structures persist. Informal settlements were the only option of housing for poor people in cities, where the competition for land and profit was high (UN-HABITAT 2003).

Strategies for early informal settlements to disappear were demolition, people where sometimes resettled. Demolition meant that houses built with local materials, traditional techniques where destroyed and social structures were interrupted.

The difference between the urban growth that took place in Europe during the Industrialization and the urbanization occurring in developing countries today is that it is not followed by adequate economic growth (UN-HABITAT 2003).

Definitions

Informality

An informal or illegal area is:

- Not reflected on a map
- Has no address
- Pays no taxes
- Does not have official access to infrastructure such as public transportation, roads, water and electricity
- Does not have official access to formal health and education
- Can not get any subsidies
- Lives outside the law

Officially they do not exist (UN-HABITAT 2003).

“Developed” and “Developing” countries

There is no standardization of the term “developed” and “developing” country, area or region. The terms are used for statistical convenience and do not necessarily judge a country on its development (UNSD 2011). Other measurements are “Human Development Index” and Gross Domestic Production (GDP) per capita. In this report the terms “developed” and “developing” are used. For more an example of countries belonging to the regions, see appendix.

Statistics

An informal settlement is often characterized by having a high concentration of people living in an area.
But the number of inhabitants living in informal settlements is difficult to estimate. Kibera is one of these examples where the estimations:

- UN-HABITAT estimate 500 000 to 700 000 inhabitants (website)
- Map Kibera Project estimate 235 000 to 270 000 inhabitant (Marras 2009)
- 2009 Kenya Population and Housing Census estimate 170 070 inhabitants (Karanja 2010)

There are different reasons of the diverse estimations. One is the nature of informal settlements being an area in flux and there are no addresses or state control. The definition of informal settlements is also vague, which also effects the estimations.

Numbers are often exaggerated because of the need for funding. Both the inhabitant and aid agencies see the advantage of exaggerating the number and getting media coverage for being one of "Africa's largest slums", which results in more funding with celebrities and politicians visiting the area (Sesana 2010).

The city boundary also affects the statistics, if a boundary expands, the numbers increase, even though the population has not increased (UN-HABITAT 2003).

Basic services

Informal settlements often lack basic infrastructure such as sanitation facilities and clean water, which leads to unhealthy living conditions. The sanitation facilities that exist are not sufficient to provide for all the inhabitants in the settlement and lack in hygiene. Water in informal settlements is not always clean and is distributed in cans.

Informal settlements usually also lack electricity supply, waste management systems, rainwater drainage and surfaced roads and paths.

Buildings

Houses are built without any infrastructure such as toilets, water systems and electricity. The building material is often regarded as "non-permanent". And the construction is sometimes insufficient due to the difficult geology of the area.

Houses can be illegal or informal because of the building standards. In some countries regulations do not permit "non-permanent" materials. "Non-permanent" materials can be houses built with earth, which half of the world's buildings are built of (Vellinga et al 2007). This aggravates the situation, because earth is often the local and cheapest material available (UN-HABITAT 2003). Good houses classified as "non-permanent" give a false picture of the situation.

Health

Informal settlements have through history been associated with poor health conditions, and this has been the main reason for improving the areas in the past. An example is the Public Health Act that was introduced in 1845 in England which demanded sewage disposal facilities and clean water for everyone. By 1900 the death rate had fallen and towns had hygienic sewage and water systems (UN-HABITAT 2003).

Employment

Most people that live in informal settlements work in low paying jobs, such as garment industry, recycling of solid waste, home based enterprises, domestic servants, security guards, furniture workers and self-employed hairdressers (UN-HABITAT 2003).

Security of tenure

The informality of an area leads to insecure tenure rights. There is often no documentation entitling the inhabitant the right to the land or buildings.

The tenure form is not the most important when it comes to security. The tenants' in informal settlements worst fear is eviction, especially if it is going to be within "hours notice" and violent (UN-HABITAT 2003).

Two thirds of the people living in informal settlements live in insecure tenure, while one third is formal renter or squatters (UN-HABITAT 2003).

Crime

Informal settlements have long been associated with criminal activity, but it has shown that this is not always the case. Instead of the inhabitants of the informal settlements being the criminals, they are exposed to crime. In, for example, Latin America the inhabitants of informal settlements largest threat used to be eviction. Today it is exposure to violence and crimes, often related to drug trafficking (UN-HABITAT 2003).

Location

In order for people to avoid eviction, informal settlements often develop on land that is unsuitable for housing. Inhabitants are often exposed to open sewers, dumping sites, railway reserves, unstable slopes, flood plains, swampland and toxic emission. With new techniques areas that were impossible or expensive to build on in the past, have now become possible. This increases the risk for eviction of inhabitants in informal settlements, especially if the land is close to city centres and highly valuable.

Different types of informal settlements

The “Global Report on Human Settlement; The Challenge of slums” have divided Informal settlements into four groups to explain the different characteristics and dynamics that shapes settlements.

[Es.] ***Estate Settlements***
These settlements are often located on the periphery of the city, starting off as public housing during the 1950-70s. They were seen as the solution to the problem with inner city informal settlements.

Estate settlements can also be housing for industrial workers, often to accommodate single men, but they eventually bring their families which leads to overcrowding. The tenure type is renting, refugee camps also fall under this category.

These areas are informal because the buildings are not following building standards and regulations.

[Ce.] ***Central Settlements***
Central settlements are small central areas that have previously been middle- and high-income areas, which have been abandoned or deteriorated due to various reasons. After the rent has decreased, someone has occupied the houses.

Central settlements used to be a larger proportion of informal settlements in the world, and they were connected to rapid urbanization in the developed world. This has changed and this type is now decreasing. The reason for this is the market value of inner city land. In most old cities these areas have been replaced with profitable commercial buildings (gentrification).

The areas are informal because there are not following building- and planning regulations.

Squatter Dynamics [Sq.]
These areas are located either in the centre or periphery of the city. The land is occupied illegally by people that build houses on the land.

Resistance of an area depends on the size, location and physical condition, but most determining is the political context and toleration of the country. Over time some areas have grown from illegal occupation to some form of recognition, usually then connected to more tolerance and better service.

Squatting used to be the most common type of informal settlement, but this has changed due to higher supervision of land especially in inner city locations.

Sub-Divided Dynamics [Su.]
These settlements are located in the city center or the periphery, these areas are on land that is legally owned, then subdivided, re-sold, let out or leased by the owners. The owners are private unauthorized developers, for example farmers that find it more profitable to convert farmland to cheap housing. This is done outside the planning system, which leads to lack of services and infrastructure.

After independence in Asia and Africa the government tuned a blind eye to squatting. The areas developed in to profitable business, especially for political leaders and people with power.

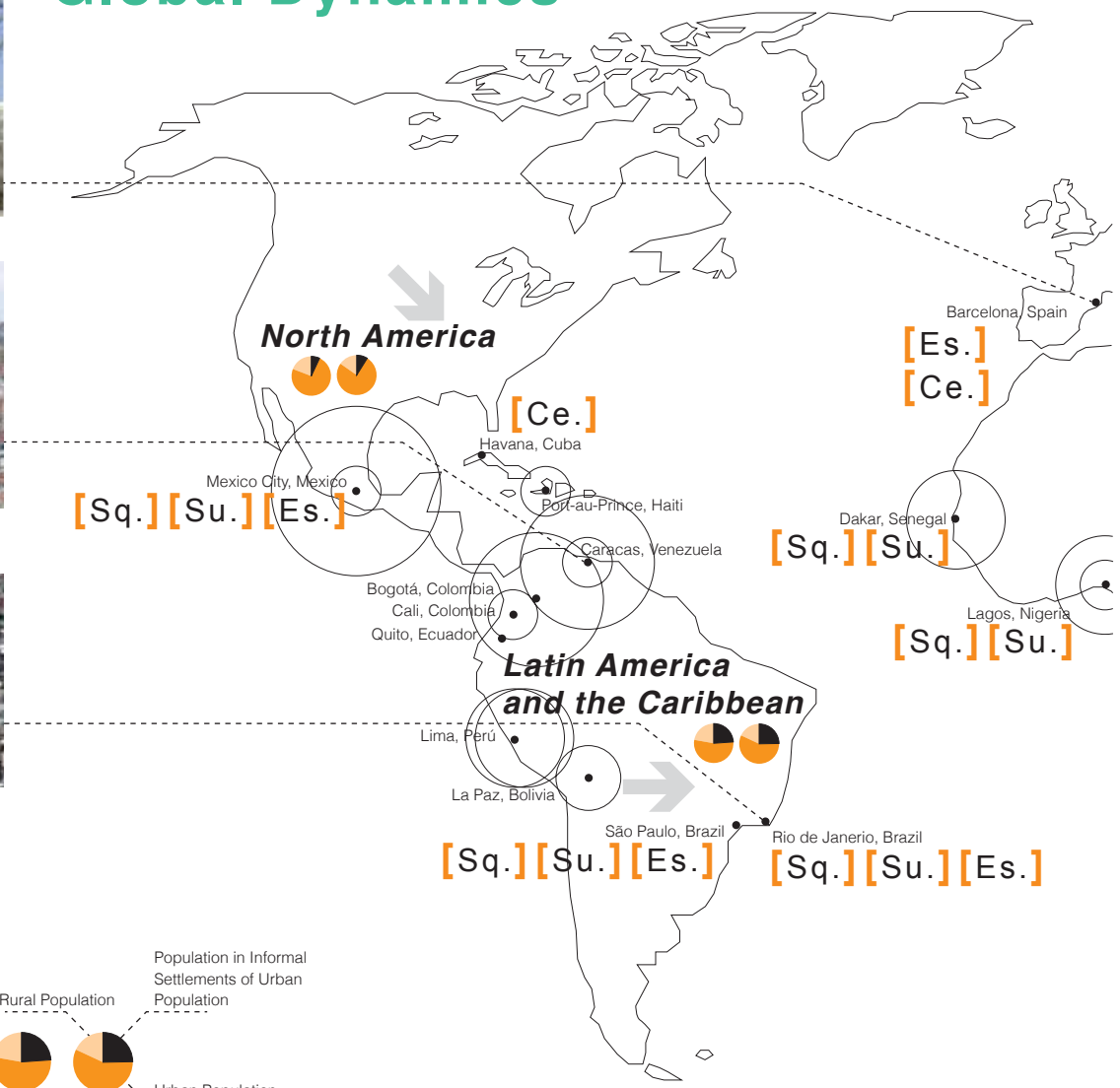
The most common dynamic in sub-Saharan Africa today is a combination of squatter dynamics and sub-division. Land is claimed by landlords, then let out per room. The buildings are not connected to any infrastructure and the buildings are not following building standards. This makes them cheap to build and the rent that is collected cover the building cost in a few months. After that it is pure profit.

Characteristics and Global Dynamics

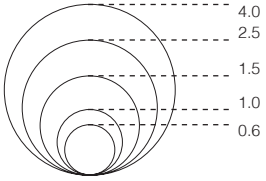
La Mina, Barcelona, Spain

Caracas, Venezuela
Source: Procsilas 2005

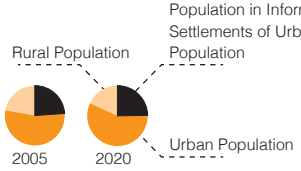
Rocinha Rio de Janerio, Brazil
Source: gregandcathsadventures 2009



[Es.] Estate Settlements
[Ce.] Central Settlements
[Sq.] Squatter Dynamics
[Su.] Sub-Divided Dynamics



"30 Largest Mega Slums"
Source: adopted from Davis 2005



Source: www.unstats.un.org 2010

Indication the trend for informal settlements

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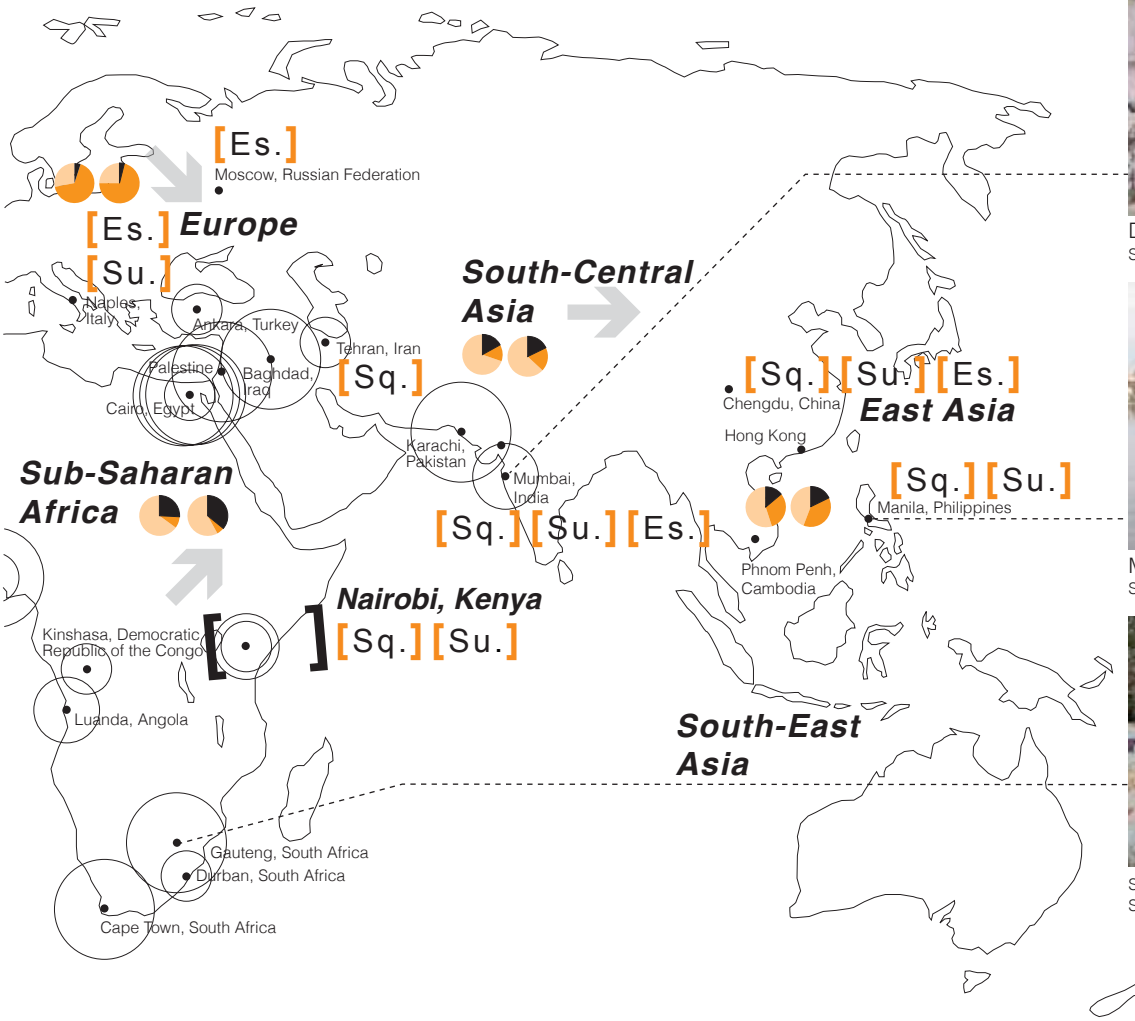


Dharavi, Mumbai, India
Source: Kounosu 2008

Manila, Philippines
Source: Rayjeanne 2008

Soweto, Johannesburg, South Africa
Source: www.ctoinc.com 2007

"Slums are a physical and spatial manifestation of urban poverty and intra-city inequality. However, slums do not accommodate all of the urban poor, nor are all slum dwellers always poor."
(UN-Habitat 2003, pp. xxvi)

Global dynamics

Informal settlements develop from a combination of reasons, mainly:

- Rapid rural to urban migration
- Increased urban poverty
- Increased inequality
- Marginalization of poor neighborhoods
- No access to low-income housing

Informal settlements play an important role in cities providing labor and produce, services and commercial actives where formal systems fail (UN-HABITAT 2003).

Population Trends

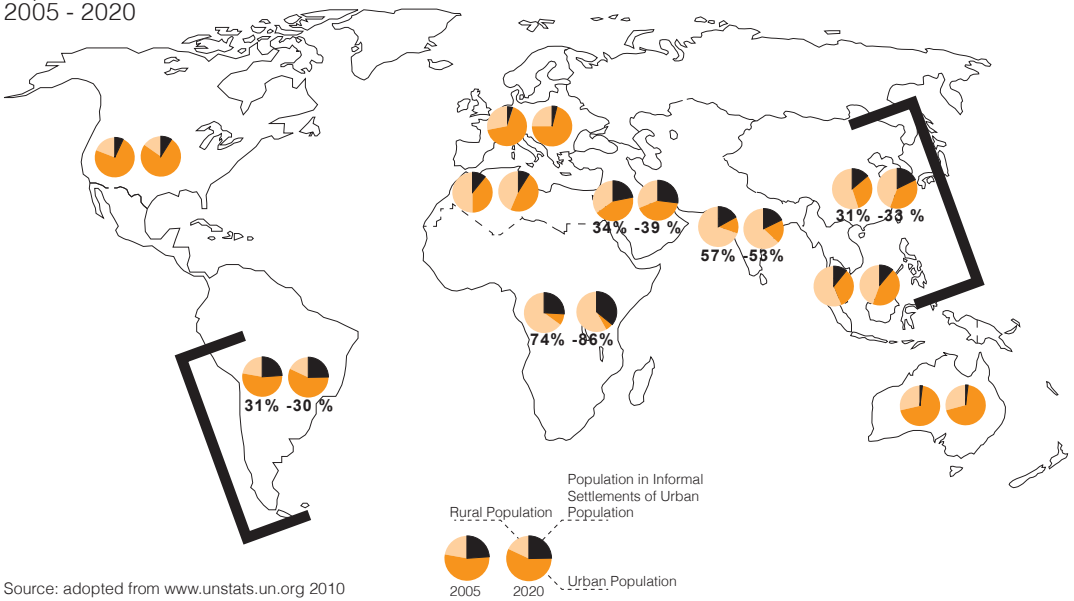
The population has grown at very high rates in the world during the last decades. The reason for this has been the success in medicine, which has increased life expectancies, and the social behavior of having many children as a way of securing a future have not changed. It takes generation for social behaviors to change, but eventually it will happen and the population will begin to diminish. A problem developed countries now are facing combined with an aging population (UN-HABITAT 2003).

In 2001, 942 million people lived in informal settlements, 31% of the worlds population at the time, the majority of these people lived in developing regions. Of the urban population 43% in developing regions lived in informal settlements and 6% in developed regions (UN-HABITAT 2003).

Sub-Saharan Africa have the largest proportion of the urban residents living in informal settlements with 72%, but Asia have most people, 554 millions.

Informal settlements have increased during the 1990s and the number of inhabitants are expected to grow to 2 billions in the coming 20 years (UN-HABITAT 2003).

Population in Informal Settlements
2005 - 2020



Source: adopted from www.unstats.un.org 2010

There are different trends in different parts of the world. In Asia the housing standard during the 1990s improved, and building kept pace with urbanization. With the financial crisis in 1997 this was interrupted and the area that was hit the hardest was South Asia where informal settlement began to increase (UN-HABITAT 2003).

In Latin America there was a wholesale tenure regulation, that changed the definition of informal settlements and decreased the numbers, but there is still a high housing shortage and large informal settlements (UN-HABITAT 2003).

There is a high stress on urban areas in sub-Saharan Africa, some parts of North Africa and West Asia, with increasing rents and falling income levels. This has resulted in increased informal settlements in almost every city (UN-HABITAT 2003).

Urban growth

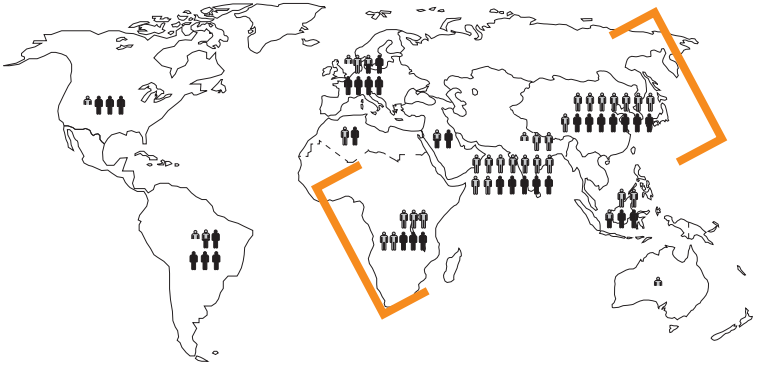
Rapid urbanization has been one of the largest socio-economic changes the last decades, and has contributed to the growth of different kinds of informal settlements, especially in developing countries. The urbanization is likely to continue for about 30 years, the major changes taking place in developing countries with an annual growth rate of 2,3%, compared to an annual growth rate in developed countries of 0,4%. This rapid growth rate puts large pressure on local governments and authorities to provide services, infrastructure, generate jobs and social support. Today especially the mid size cities in the global south are growing (UN-HABITAT 2003).

Natural Growth

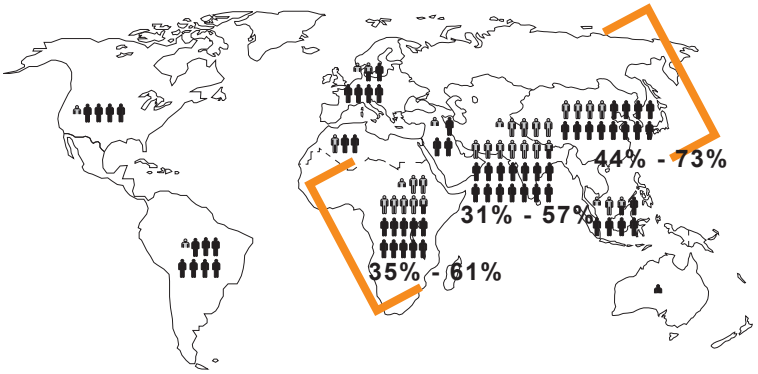
The main reason for urban growth is internal natural growth, where inhabitants gets many children, these social behaviors have not yet cached up with the life expectancy (UN-HABITAT 2003).

Rural to Urban Migration

The second reason for urban growth is migration from rural areas caused by civil war, repression, climate change and social factors. The cities lure with higher income levels and greater employment opportunities, but also social services and infrastructure (UN-HABITAT 2003).



Total Population and Urban Population 2005



Expected Total Population and Urban Population 2050

Rural population
100 000 000 people

Urban population

Rural areas are where the world's food production is taking place and this has also been the rural inhabitants livelihood. With the Green revolution, technology has made it possible to improve the productivity of land and increase the production to support the world's inhabitants. But with higher production and more efficient technology less labor is required, leaving the people in rural areas without employment (UN-HABITAT 2003).

The farms are large estates with enclosed land that before were common grounds. Farming uses fresh water for irrigation in areas where water is scarce and could have been used for drinking. The local inhabitants do not gain from the industrial farming when the crop that is produced is exported, because the economic profit is higher. The result is that population in rural areas are displaced and travel to the cities to improve their lives, where they often live in informal settlements.

The informal settlements are colored by the rural habits, people continue to live like they did in the rural areas with small-scale farming, building the houses in the same material and techniques according to tradition in the rural areas. This is similar to trends today in western cities, where urban food production is seen as one of the answers to a sustainable urban future.

Poverty

Informal settlements are not always equal to poverty; some people are living in poverty and others have reasonable incomes. But informal settlements are congregations of poverty, which makes poverty more visible. (UN-HABITAT 2003)

Poverty is often defined by monetary wealth and the most common measure is "Absolute Poverty" or "Poverty line". People who cannot afford basic human needs like water, food, health care, education, clothing and shelter live in poverty, and this is measured by the World Bank extreme poverty index as living on less than US$1.25 (PPP) per day, moderate poverty is living on less than US$2 or US$5 a day. PPP means that it is adjusted to the countries purchasing power party (local cost). This has been the most common way of measuring poverty since 1993.

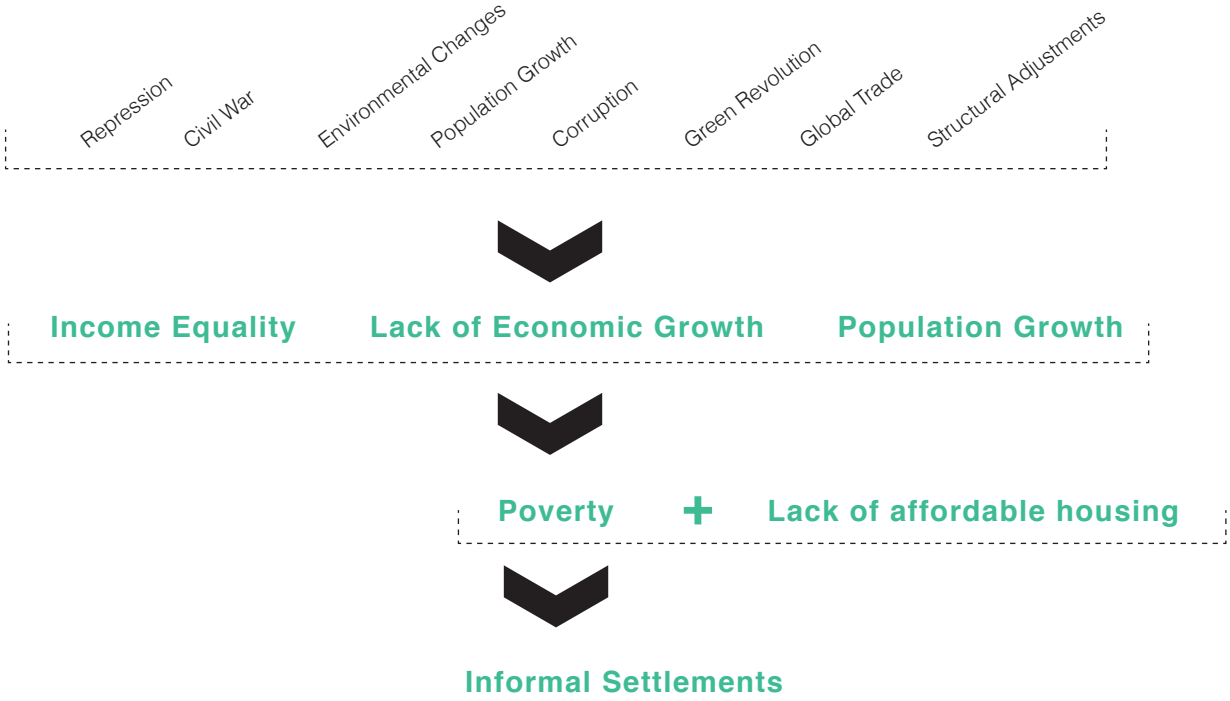
In 2003, 3 billion people lived on less than US$2 per day and 1.2 billion people lived in extreme poverty (under US$1 per day). From 1990 to 1999 the world's population living in extreme poverty decreased from 29% to 23%. This was mostly because of improved lives of 140 million people in East Asia between the years 1988 to 1998 (UN-HABITAT 2003).

Defining poverty in monetary wealth neglects the wealth that can exist in other forms. A farmer may not have a lot of money, but does have the opportunity of growing food and keeping livestock and securing basic needs. In this way a farmer needs less money than a person in an urban area to cover basic needs. The statistics show that rural poverty is higher than urban poverty, but urban poverty is growing faster then rural. The cost of living is higher in urban areas, with extra costs for housing and transportation, and with limited possibilities to keep livestock and grow vegetables. Today, when a lager part of the population in developing countries live in cities; it can be argued that the poverty line of US $1.25 (PPP) per day should be higher because of the higher living expenses in cities (UN-HABITAT 2003).

Although the poverty measurements have many sides that make them inaccurate they give a general idea of where the world is heading (UN-HABITAT 2003).

Globalization

Economists commonly refer to globalization as the outcome of politics, economics and technology. Different politics have lead to different economic theories being implemented having different results on the world market and the rise and fall of the inequality in the world.



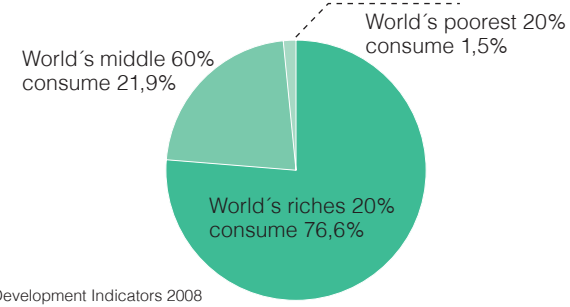
Main Reasons for Informal Settlements Growth

Source: adopted from UN-HABITAT 2003

"Peace lies in nourishing ecological and economic democracy and nurturing diversity."

Vandana Shiva

Share of Worlds Private Consumption, 2005



Source: World Bank Development Indicators 2008

Inequality increasing between the countries in the world contribute to richer countries acquiring more wealth and poor countries losing wealth. This in turn leads to informal settlement in poor countries.

Recent changes in the global economy has resulted in an increased fluctuation of the market, which has decreased formal employment, especially in developing countries, leading to growing inequalities. During 1970, the top 20% of the world's people in the richest countries had 32 times the income of the poorest 20 %. This grows to 45 times in 1980, 59 times in 1989, and about 78 times at present (UN-HABITAT 2003).

Most of the monetary capital in the world is concentrated to North America and Western Europe, but most of the population and the largest informal settlements are in the global south.

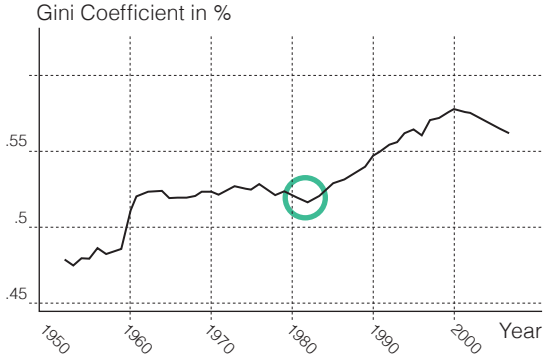
Privatization

During the 1980s and 1990s there was a shift in dominating economic theory in the world. From the middle of the 20th century the dominant theories had been Keynesian or social movements, where in both, the government played an important role redistributing wealth and providing services. These theories where to a large extent replaced by neo-liberalism, which was based on privatization and the free market (UN-HABITAT 2003).

By liberalizing trade, the market would solve problems with inequality and dysfunctional government institutions. On a free world market everyone would compete for the trade and the companies providing praiseworthy products would win. Developing countries would compete on the same premises that other countries. Unfortunately, developed countries were already too far ahead and countries could not compete on equal conditions. Where developing countries were able to compete and increase their economy the wealth was and is not distributed within the country. The low-income groups did not benefit and the inequality and social exclusion in the world increased (UN-HABITAT 2003).

The neo-classic theory of why spatial segregation occurs is based on the thought that the group that pays the higher price for the land will occupy it. Some land is not attractive to high-income groups and that is why they are not gentrified, but these conditions can change fast.

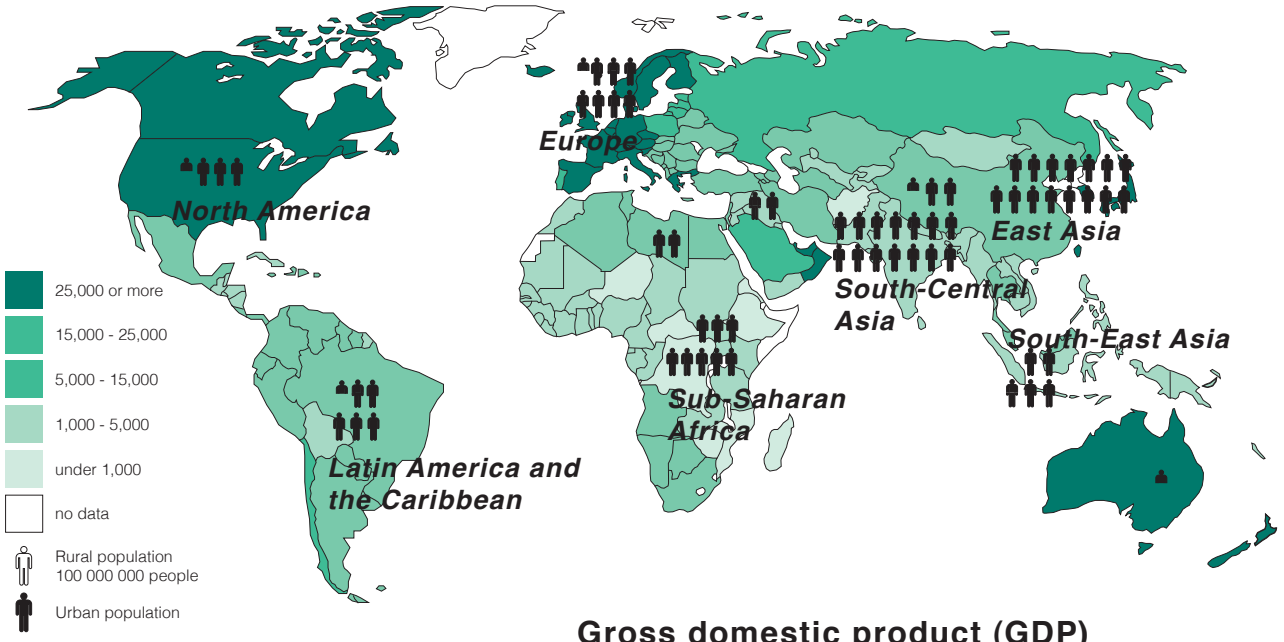
Global Income Differences



Source: Branko Milanovic, Global inequality recalculated: The effect of new 2005 PPP estimates on global inequality

The group that pays the higher price for the land will occupy it

Most of the monetary wealth in the world is concentrated to the "Western world". This is not where the most people live, not where the informal settlements are and not where cities are expected to grow the most.



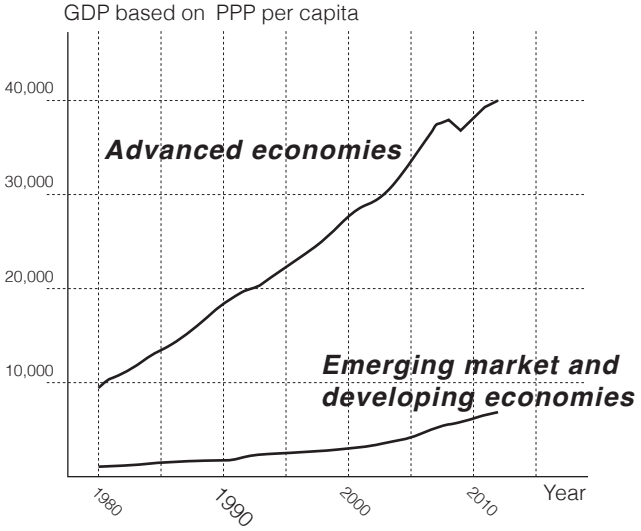
Source: International Monetary Found, www.imf.org

Gross domestic product (GDP) per capita, 2008

In Kibera the low-income groups pay more than others are willing to with the limited services the area provides, but low-income groups do not have any other options for housing in urban areas. In Kibera 90% are tenants and rent their room from landlords. Estimate that a household pays approximately 1 000 Kenya Shillings (Ksh) per month in rent, then Kibera will generate 86 000 000 Ksh a month (640 000 € / month) (Marras 2009). The landlords make substantial profit from these neighborhoods. The landlords are often people from the elite of the society or wealthy people living in Kibera. This prevents many initiatives that involve landlords losing control over areas. They often reacquire compensation for loss of income.

The retreat of the state has lead to that government can not monitor or facilitate low-cost housing that can replace informal settlements. However, the concept of a government has never functioned on the African continent. The concept was introduced with the colonization regime and never adapted to the local traditions.

GDP per capita growth



Source: International Monetary Found, www.imf.org

Trade

Developing and developed countries or regions are not competing on the same conditions. Tariffs and subsidies limit the trade. Countries in Africa that want to be a part of the world trade have begun to produce cash crops (coffee, tea etc.) at the expense of producing staple food. This then needs to be imported at high prices jeopardizing the food security of the countries (UN-HABITAT 2003).

Africa has always been exporting raw material and is therefore dependent on the import of goods (UN-HABITAT 2003).

Structural adjustment programs (SAPs)

SAPs were introduced in the 1980s by the World Bank and International Monetary Fund to save countries from public bankruptcy. The economic theory was based on the neo-liberal agenda. The programs were given to countries on the condition of opening up the economies for foreign investment, the removing of subsidies and cut in public investments. This would improve the efficiency of the often corrupt and dysfunctional governments. The SAPs gave some relief to the public budget when they were introduced, but the foreign debt that the countries were immersed in left the economies harmed, especially in Africa. An example of the retreat of the state in DRC was the cut in health and education workers with about 80 000 from 1980 to 1985. With the removal of restriction on international capital it is easy for investors to bring the wealth out of a country (UN-HABITAT 2003).

For countries in Africa that had opened up their economies through the SAPs, export was seen as the means to economic growth. Export products came from agriculture, with cash crops giving the highest income from international exchange. Because of this the SAPs had a rural bias and the urban areas were left without investments. But even though export increased it was not enough for the debt to be paid. For every aid dollar that went into the continent of Africa in 1993, three dollars left again in debt. In 2003 four fifths of Uganda's export earnings went to debt services (UN-HABITAT 2003).

The Informal Sector

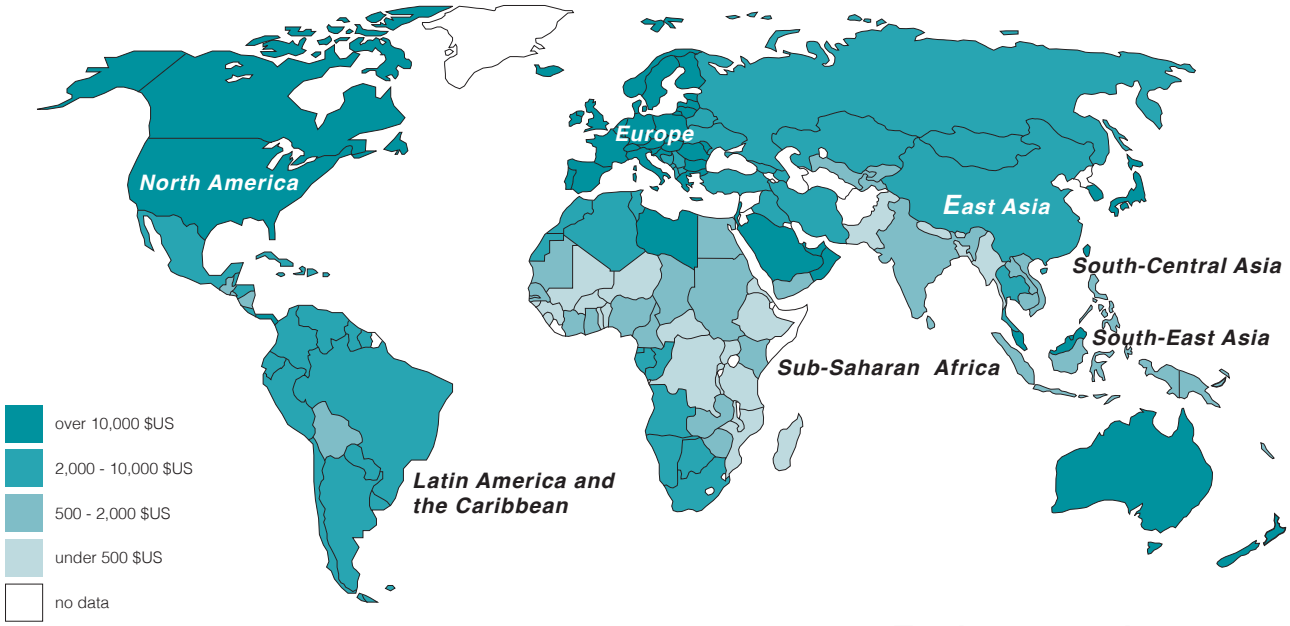
Where the formal markets fail to provide employment opportunities and services at affordable prices the informal economy steps in. In informal settlements the informal economy plays a big part in the everyday life providing water, electricity and food. Most of the employment in the informal settlements comes from work in the informal economy, and often the incomes from work in the informal economy are higher than formal incomes (UN-HABITAT 2003).

An informal activity is often a small-scale industry or commercial enterprise that is not registered, and pays no taxes, that would be too expensive for the enterprise. But in many developing countries enterprises pay bribes.

The informal sector is estimated to be contributing to 37% of the urban workforce in the world, and up to 78% (non-agriculture employment) in Sub-Saharan Africa. Informal businesses contribute to formal business and is estimated to be 42% of the GDP in Sub-Saharan Africa (UN-HABITAT 2003).

Working conditions in the informal sector are hard, with long hours, unsafe workplaces and unsecure employment (UN-HABITAT 2003).

Many housing schemes addressing informal settlements ignore the informal sector and therefore fail. The informal sector is the communities' livelihood and people choose their house because of the location (UN-HABITAT 2003). People pay more for houses that have access to the street so they can open a shop which will provide an income. If they are moved to the third floor in a concrete building their income opportunities are removed.



Source: World Trade Organization www.wto.org

Trade per capita, 2011

"International gentrification"

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Actors and Approaches

Policies and approaches

Generally the approaches towards informal settlements have shifted from negative policies as forced eviction, neglect and involuntary resettlements to positive approaches. Positive policies are self-help programs, in-suit upgrading, enabling and rights-based policies (UN-HABITAT 2003).

The most successful examples of improving informal settlements have been developed by the inhabitants themselves, and sometimes with the help of upgrading policies. In-suit upgrading has also been more successful rather than resettlement, which often destroys the proximity to employment. Traditional approaches have concentrated on improving the physical environment with housing and infrastructure. The "enabling approach" is the official policy for many agencies and countries (UN-HABITAT 2003).

Negligence

Negligence dominated the developing countries until the early 1970s when it was replaced by public housing. Informal settlements were regarded as illegal and temporary unavoidable phenomena that would pass with economic development. During this time informal settlements were not depicted on land use maps, instead there was a blank for undeveloped land (UN-HABITAT 2003).

Eviction

Eviction was common during the 1970s and 1980s, especially in countries with centralized politics and weak local governance. In these countries legal protection against forced eviction was weak and the government did not recognize the civil society (UN-HABITAT 2003).

Eviction was used in many urban renewal projects, particularly in redevelopment of city centres or infrastructure projects. Evicted inhabitants were seen as illegal and did not get any compensation. After eviction they often moved to the fringes of the urban areas were land was less attractive. This was the beginning of the informal housing market, where squatting areas became sud-divided (UN-HABITAT 2003).

Public housing

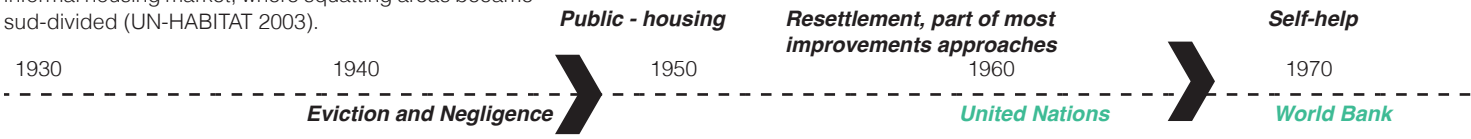
Public housing is implemented on national level with the aim of proving housing for low-income households. During the 1930s to 1970s in developed countries this was done through re-housing. New high-rise housing blocks where built through "public-private partnership". People were moved to the new areas, while their old housing was demolished. The demolished houses were often of heritage value (UN-HABITAT 2003). These areas later became stigmatized and segregate cities.

After the 1980s, the public housing approach was replaced by neo-liberal theories focusing on housing allowance. Later in the 1990s, Europe focused on area based interventions. The local interventions could be less uniform buildings, tenants control or housing associations. One of the negative outcomes was decreasing tenant security (UN-HABITAT 2003).

Public housing was implemented in the developing countries during the 1960s and 1970s with the developed countries as a model, but never to the same extent. The scheme never worked because of dysfunctional governments and corruption, which was a result of post-independence with constrained economies. It is estimated that 100 000 dwellings were built and these were often used for governmental employees (UN-HABITAT 2003).

Self-help

The self-help approach became popular in the late 1970s as a response to earlier strategies implemented by public services. Self-help and upgrading policies were based on providing basic urban services, innovating solutions to secure tenure and access to credit. Self-help approaches were mainly two types: "site and services" and "upgrading" (UN-HABITAT 2003). The main actor of self-help strategies were the World Bank and United Nations.



The self-help approach gave some success and was considered to be the cheapest alternative by the World Bank, but it was outdated in the 1990s when too many projects had failed because of poor governance and maintenance. Projects that had been implemented, like public toilet blocks and water pipes did not function because of lacking maintenances or water supply. The reason for this was isolation between government and the community, government not following through with facilities and the implementing international agencies leaving the project (UN-HABITAT 2003).

Enabling approach

The enabling approach focused on secure tenure and economic development with the inhabitants' participation, not only in the construction, but also in the design and decision making process (UN-HABITAT 2003).

In the middle of the 1980s enabling approach began to develop and resulted in the "Habitat Agenda" in 1996, with the aim of subsidies to decision making in communities or neighborhoods. Decisions about economy, social and physical development were believed to have the best impact if they were made by the inhabitants. But for these decisions to be well formulated the community needed training, organization assistance and financial help, that was supported by governments, the civil society or non-governmental agencies (NGOs) (UN-HABITAT 2003).

This approach has worked fairly well, but has been difficult to implement because of the different context in informal settlements and because the process is time consuming (UN-HABITAT 2003).

Resettlement

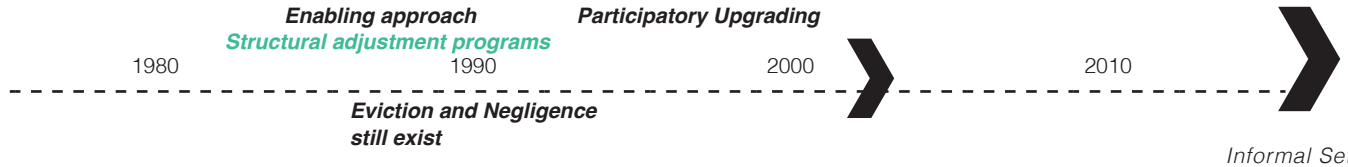
Resettlement is associated with all types of approaches towards informal settlements, but with the goal to free land for development. In the best cases, the resettlements are done in cooperation between the community and other involved stakeholders. In Mumbai, India people were moved from the railway reserve with the involvement of the community, local NGOs, Slum Dwellers Federation, the Indian Railway and the World Bank. The worst example of resettlement provides little more than eviction, often a peripheral site without any access to infrastructure, services or transport (UN-HABITAT 2003).

Participatory Upgrading

Participatory upgrading is today regarded as the best practice of improving informal settlements. Upgrading is similar to "site and service", but upgrading involves regularization of right to land and housing, improving infrastructure, building schools and clinics. It does not involve home construction, but does offer loans for improvements. The aim is for the community to manage and maintain the area. Upgrading is also more affordable than demolition or relocation (UN-HABITAT 2003).

Changing Cities

Cities are always changing and the lessons learned from approaches towards informal settlements need to evolve with the current trends. Today the largest issue is the increasing inequality between countries. Countries compete for global investments with cheap labour and tax breaks. This makes working conditions harder. With no economic growth, the countries have large problems with informal settlements, and because of the withdrawal of the state and social security there is no instrument to combat the problem (UN-HABITAT 2003).



The range of actors involved in informal settlements

[iA]

International agencies

Generally the international aid and cooperation programs involved in informal settlements focus on the underlying causes of poverty, and how to involve the community. Actions have been elimination of regulations and policies acting against poor, for example removing prohibition against informal commerce that is income-generating or relaxing unrealistic building codes (UN-HABITAT 2003).

There are two types of international aid agencies; bilateral agencies and multilateral agencies. Bilateral agencies work with one partner, for example a country. Depending on the donor country's political view the objective of the programs differ. There are three main types of approaches, the neo-liberal agenda, the social-democratic and a combination of them both. The neo-liberal agenda promotes the withdrawal of the public sector and emphasizes private funding and economic liberalization, USAID is one of these. The social-democratic countries want to strengthen the municipalities to improve the management capacity, coordination, funding and services. The third alternative, a combination of both, companies have a social or economic liberalization goal, but depend on the local situation (UN-HABITAT 2003).

Multilateral agencies are a collaboration of several actors or an organization with the same goals. United Nations (UN), the World Bank (WB) and the European Union (EU) are example of multilateral agencies. They have similar agendas creating livable, competitive, well governed, managed and financially sustainable cities (UN-HABITAT 2003).

An important actor in urban development is inter-agencies programs and initiatives. These are collaborations of actors. An example is "Cities Alliance", which consists of representatives from the poor, local authorities, national governments and bilateral and multilateral agencies (UN-HABITAT 2003).

The most pressing issues for agencies are financial constraints, contradiction between economic and social goals, coordination and cooperation (UN-HABITAT 2003).

Civil Society

The most common definition of the civil society amongst donors and governments is: "voluntary associations" that promote democracy. These are mostly professionalized non-governmental organizations (NGOs) and community-based organizations (CBOs) (UN-HABITAT 2003).

Residents

Households in informal settlements often consist of internal inequality, often between men and women. It has been recognized that credit to women in households benefit the whole household. Often a substantial part of a poor household income comes from the community or neighborhood, through collective gardening etc. The networks of neighbors are essential for helping each other when there are no social services. This is one of the reasons for the congregation of people with same origin, religion or ethnicity. It is often easier to connect, and a network is formed faster. Some households in informal settlements are more vulnerable than others to recent migrants, ethnic and religious minorities and single parent households for example (UN-HABITAT 2003).

Community-Based Organizations (CBOs)

[CBOs]

CBOs, also named grassroots organizations, consist of members of a community that have formed a group for a cause. The cause can be a leisure activity, developing and maintaining infrastructure, protest, advocate or campaign for something. CBOs vary in size and can be both formal and informal; some are founded by the state to establish partnership for projects. CBOs can be non-

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profit or profit making. They are dependent on voluntary labor. Most CBOs receive support from the government, religious institutions, other CBOs or NGOs. To get more influence CBOs can form networks (UN-HABITAT 2003).

CBOs can be undemocratic in themselves, when marginalized groups are excluded. Emphasis has been to make everyone heard (UN-HABITAT 2003).

[NGOs]

Non-Governmental Organizations (NGOs)

Non-governmental organizations are organizations with no involvement of the state. There is sometimes an understanding that NGOs are non-profit, but the definition is not clear and NGOs exist that have connection with the state and make profit. Simplified there are six types of NGOs (UN-HABITAT 2003):

- Relief and welfare agencies, including missionary societies
- Technical innovative organizations
- Public service contractors, often working with government and aid agencies to implement official programs
- Popular agencies, connected to both developed and developing countries working with self-help, social development and grassroots democracy
- Grassroots organizations, where the members are the people exposed to the problem the organization works with
- Advocacy groups and networks, focusing primarily on education and lobbying

The NGOs have grown drastically since the 1980s, both in numbers and in types of services they provide. The main reason for this is the political neo-liberal change with less state involvements and SAPs (UN-HABITAT 2003).

During the 1970s, donations from developed to developing countries was questioned. This was due to the contradiction that NGOs in the developed world were, and still are connected to the finance in the developed world that exploit the developing world.

Today NGOs of different scale have become the main channel for funding in development projects. Large NGOs get funds from donors and governments, which go into small-scale NGOs, CBOs or grassroots organizations at the local level (UN-HABITAT 2003).

Criticism towards NGOs are that they have become to involved with the funding actors, and tailor their proposal to receive funds instead of advocating for their original purpose. NGOs have also been criticized for their accountability, without any actor surveying the overall picture the aid often goes to one area and others get no help. The most attractive areas for funding are where the poverty is not too severe and people can fairly easy be “helped”, which then can be reported to the donors. Resulting in short-term planning and commitments (UN-HABITAT 2003).

Case studies

Slum/Shack Dwellers International (SDI)
SDI is a network of CBOs in 33 different countries in Africa, Asia and Latin America. The network shares knowledge and communicates the needs of dwellers in informal settlements to governments and international organizations (SDI 2012).

An example of work done in India was an enumeration, which could then be used for negotiation for service or as a baseline in upgrading projects (UN-HABITAT 2003).

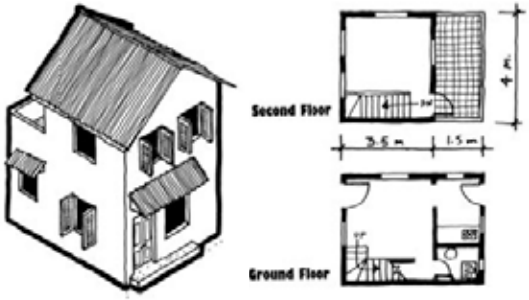
Philippine Alliances
Philippine Alliances is mobilizing the informal settlers in the Philippines though a community-driven process of savings. The alliances consists of the Homeless People's Federation of the Philippines, Inc (HPFPI) and Philippine Action for Community-led Shelter Initiatives, Inc (PACSII). HPFPI is the implementing part of the alliance and has a network of 200 associations of urban poor in 14 cities. PACSII supports HPFPI with funding, intermediation, policy direction, link to stakeholders (Homeless Visayas 2012).

HPFPI's core activity is saving programs, which are based on regular savings from the members in the community. The credit can then be used for small enterprises, emergencies and daily needs. Daily savings suits the earning patterns in informal settlements best and gives the poorest people a chance to save. The community can also have a land and housing savings account that is used for purchasing land together. Savings are good for the community because the members develop collective management skills and money that goes into community savings circulates many times in the neighborhood economy (Philippines Homeless People's Federation 2001).

[CBOs]

Savings groups have shown that they have development ideas, economic funds and are organized as a collective, which have given them more funds from governments and other NGOs (Philippines Homeless People's Federation 2001). Today the alliance has developed many different programs, one being the Community-led Infrastructure Finance Facility (CLIFF). CLIFF has through a participatory process in all stages from planning, housing design, procurement and construction management, developed affordable housing, often in sustainable material as in San Isidro, iloile City, where the houses are built in compressed earth blocks (Homeless Visayas 2012).

Community-led



Payatas Scavengers Association "Starter House"
Source: Philippines Homeless People's Federation 2001

Compressed Earth Blocks
Source: Philippines Homeless People's Federation 2001

Community-Led Infrastructure Finance Facility (CLIFF) Housing Project in San Isidro Relocation Site, Jaro, Iloilo City
Source: Homeless Visayas 2012

Learning exchange in HPFPI
Source: Stewart Paul Torre 2012

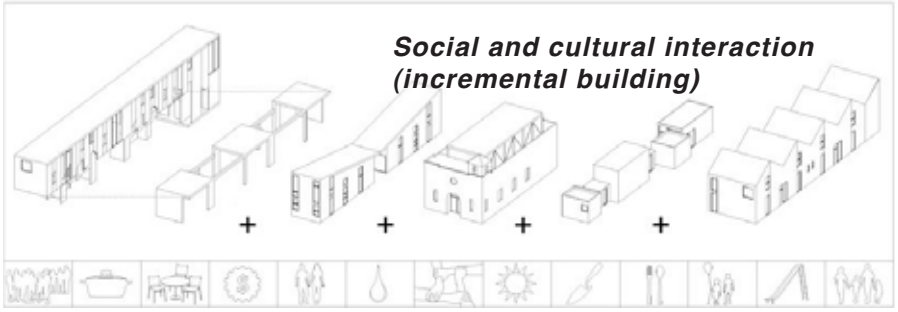
Casa Familiar: Living Rooms at the Border

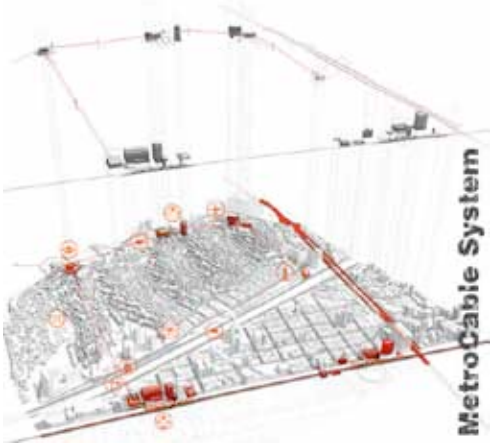
Casa Familiar is a locally based NGO, which through this project has grown from social service provider to developer of affordable housing and converting the neighborhood to be a producer of culture, economy and political participation. The project is located in San Ysidro, California and the architects are from Estudio Teddy Cruz (Estudio Teddy Cruz 2010)

The project began with Casa Familiar retrieving a parcel of land with a church, this parcel was then subdivided into smaller plots and the church was retrofitted with a community hall, social and economic projects. Around the old church, housing, small offices, artist studios and semi-open markets for informal activity were organized. The realization of the project is incremental, where the first step was to equip open structures with electricity, collective kitchens and movable urban furniture. These were programmed with social and economical activities; for example informal markets (Estudio Teddy Cruz 2010). For the realization of the builds, Cruz and Casa Familiar had to campaign for changing of the zoning laws (Ouroussoff 2006).

The project was inspired by the informal settlements in Tijuana. With the objective to "distill the essence of this community's patterns of use, and to let these patterns become the basis for incremental design solutions with a catalytic effect on the urban fabric" (Cruz 2005).

Housing Project in San Ysidro, California, Estudio Teddy Cruz
Source: Estudio Teddy Cruz 2010

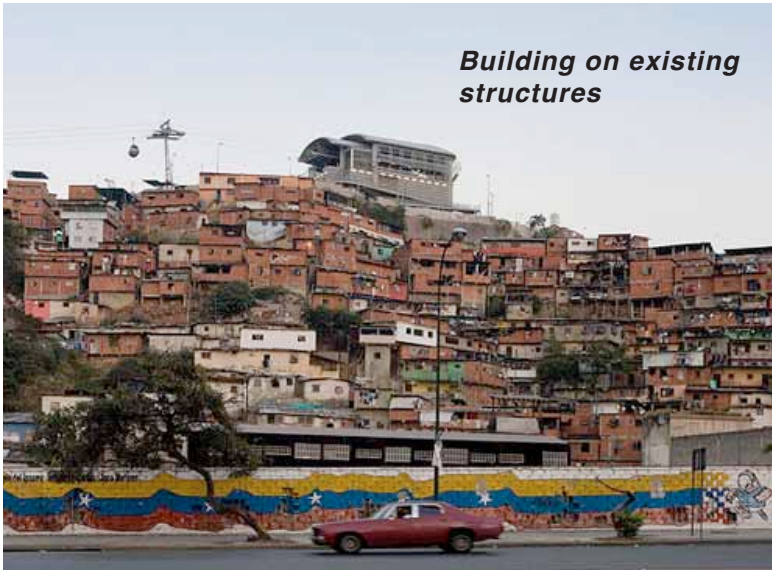




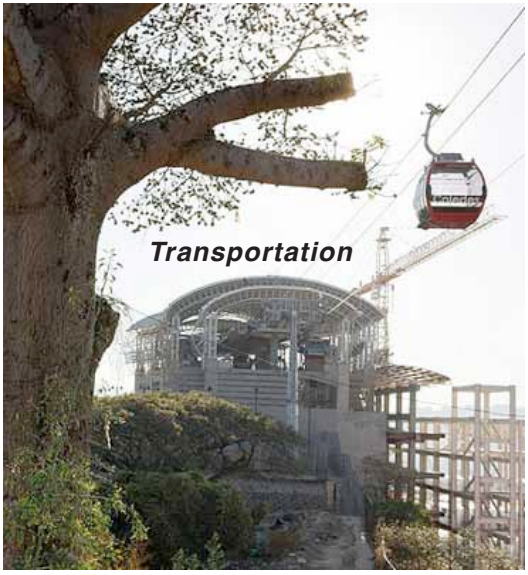
Metro Cable

The metro cable system is located in the mountain regions in San Agustin, Caracas, Venezuela and was finished in 2010. The system consists of gondolas integrated with the Metro system of Caracas. Each gondola holds 8 passengers and can transport 1 200 people per hour in each direction. Architects for the project were the Urban-Think Thank (Urban-Think Thank 2010).

There are 5 stations, two that connect to the metro in the valley and three at the mountain ridge. The stations have common designs, but each station also has a program for different social activities, such as supermarket, gym and day care center (Urban-Think Thank 2010).



Metro Cabel Prototype
Source: Urban-Think Thank, from www.moma.org



Metro Cabel in San Agustin, Caracas, Venezuel
Source: Urban-Think Thank

Program
- emphasize existing positive situations

The program for this project is based on inspirations from different case studies and the concept of "sustainable development"; the social, economic and ecological perspectives.

Implementation on different scales
For improvement of informal settlements in the world there is a need for intervention on different levels: local, regional and global. The program focuses on interventions that can be done on the local level, and that hopefully will develop and have effect on other levels.

The main problem is that informal settlements generate monetary profit. It has become a vicious circle that needs to be broken. All actors; inhabitants, landlords, municipalities, governments and international actors need to work together to improve informal settlement and reduce the risk of gentrification with physical improvements. The program is for ***self-advocacy, which can help communities to organize and strengthen their voice.*** This can then reduce the risk of gentrification when interventions can be tailored for the communities economy.

Land is one of the largest issues, but this project does not focus on it. The issue needs to be addressed with involvement of the government (especially on governmentally owned land) or others that can facilitate the process. But secure tenure is more important to inhabitants in informal settlements than ownership of land and housing, which is often too expensive. Also the interventions done before with land title has often lead to conflicts (UN-HABITAT 2003).

Informal Sector
Informal settlement is not a housing problem, rather a question of income (UN-HABITAT 2003). This statement is emphasizing that informal settlements are a symptom of poverty, and improvements of informal settlements depend on income opportunities. The informal sector is the natural income source in informal settlements, and the informal sector also provides services to the areas at prices the settlers can afford.

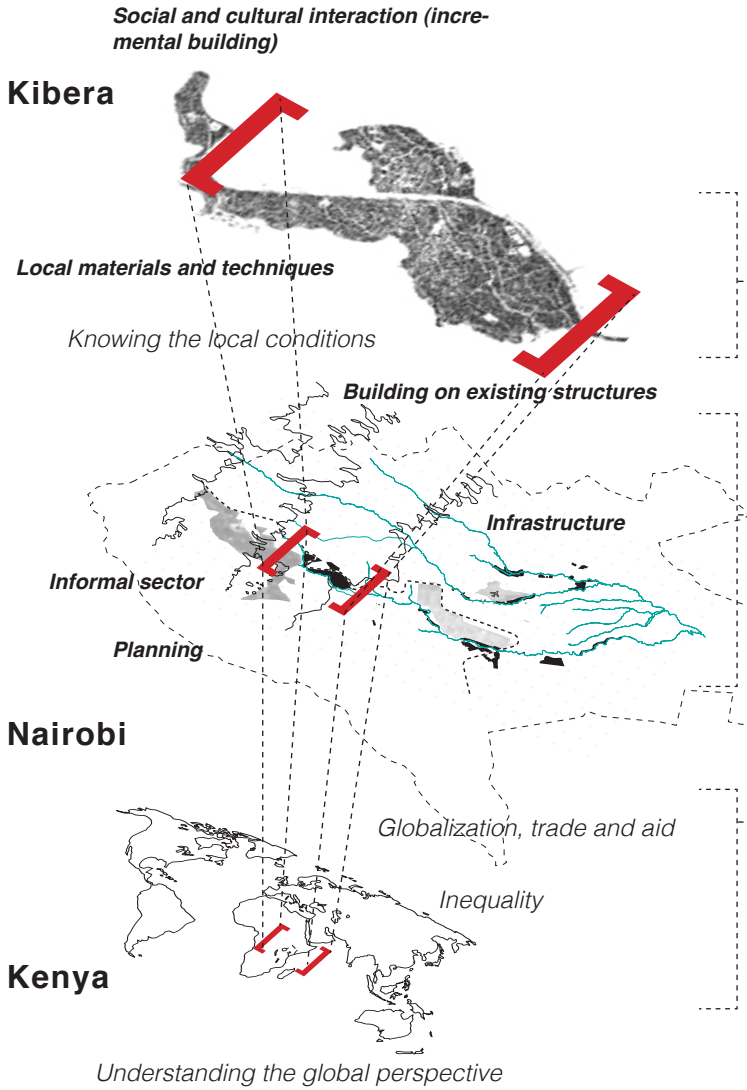
Many interventions neglected the informal sector, and when new concrete high-rise buildings are built, the opportunities for informal activities are reduced. Newly developed areas are only for housing and not the mixed use that informal settlements are known for. This is also a problem in developed countries. Therefore it is important to ***facilitate opportunities for informal activities.***

Social and Ecological aspects
Social and ecological aspects are part of the "sustainable development" concept. The local traditions are based on natural available material and techniques best suited for the local climate. Using local traditions can be an ecological way of building, and also suited to the culture. Therefore, ***learning from the existing conditions, history, traditions and culture is one core of the program.***

Infrastructure
Infrastructure is the most pressing issue, especially ***water and sanitation***, which will reduce the health problems that exist in informal settlements.

Reliable internet connections and electricity is also important. Internet can be used for knowledge exchange and education. Electricity is fundamental to many businesses and to reduce charcoal in cooking. With light in homes during evenings, more hours of the day can be used.

- ***Self-advocacy***
- ***Facilitate opportunities for informal activities***
- ***Learning from the existing conditions, history, traditions and culture***
- ***Infrastructure, especially water and sanitation***



Intervention

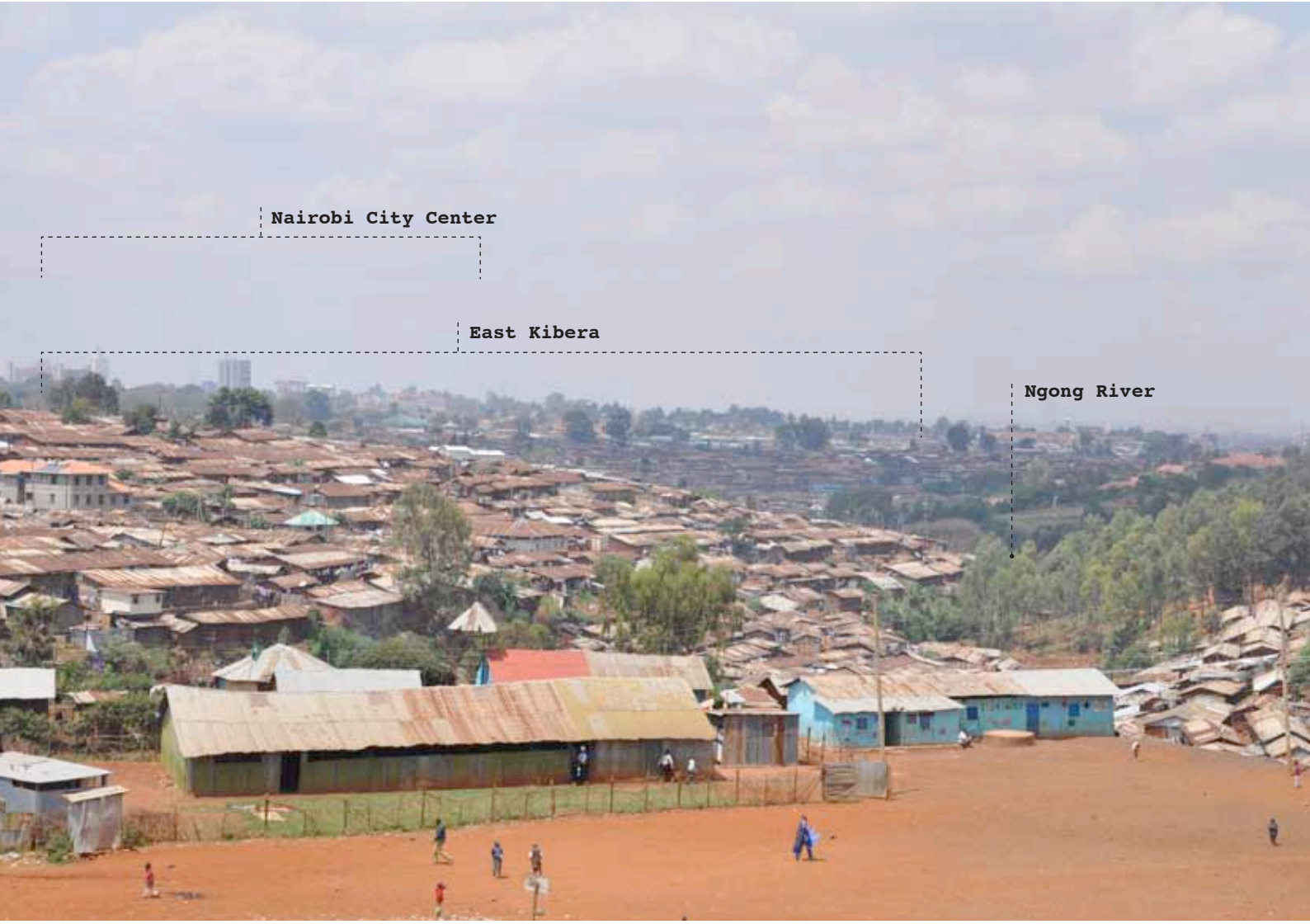
The physical improvements need to come from the inhabitants and connect to their cultures and traditions. With a better self-confidence and control of the process, the community can evaluate foreign influences and reject bad interventions.

City level

The role of the municipalities and government should be to accept informal settlements and the informal sector and incorporate the informal in the overall city planning. But there is also a need for new planning ideas, which are adapted to the patterns of life in informal settlements.

Global level and National level

On the international level the world has to realize that inequality is increasing in the world. Everyone has to understand how people's choices in developed countries affect people in developing countries and their possibilities for an acceptable life. The answer is not aid and loans; this may only cure small parts of the symptoms of poverty.


Nairobi City Center
East Kibera
Ngong River

2.0 CONTEXT AND BACKGROUND

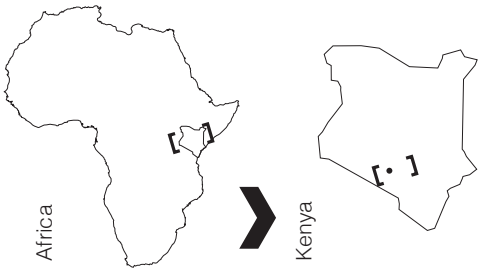
This first part of this chapter describes the local conditions in Kenya and Nairobi and how the country and city has developed through history, from colonization, independence to today.

The second part of this chapter describes the complex situation in Kibera, with social and physical factors becoming the foundation of the project.

Kenya

Capital
Nairobi
Area
580 367 square kilometers
Population
41 070 934 (July 2011 est.)
Climate
Varies from tropical along coast to arid inland
Terrain
Low plains in the west rise to central highlands, which is bisected by the Great Rift Valley
Natural Resources
Limestone, soda ash, salt, gemstones, fluorspar, zinc, diatomite, gypsum, hydropower and wildlife
Ethnic Grups
Kikuyu 22%, Luhya 14%, Luo 13%, Kalenjin 12%, Kamba 11%, Kisii 6%, Meru 6%, other African tribes 15%, non-African (Asian, European, and Arab) 1%
Languages
English (official), Kiswahili (official), numerous indigenous languages
Religions
Protestant 45%, Roman Catholic 33%, Muslim 10%, indigenous beliefs 10%, other 2%
Age structure
0-14 years: 42.2%
15-64 years: 55.1%
65 years and over: 2.7% (2011 est.)
People living with HIV/AIDS:
1.5 million (2009 est.)
Government type
Republic

Source: CIA 2012



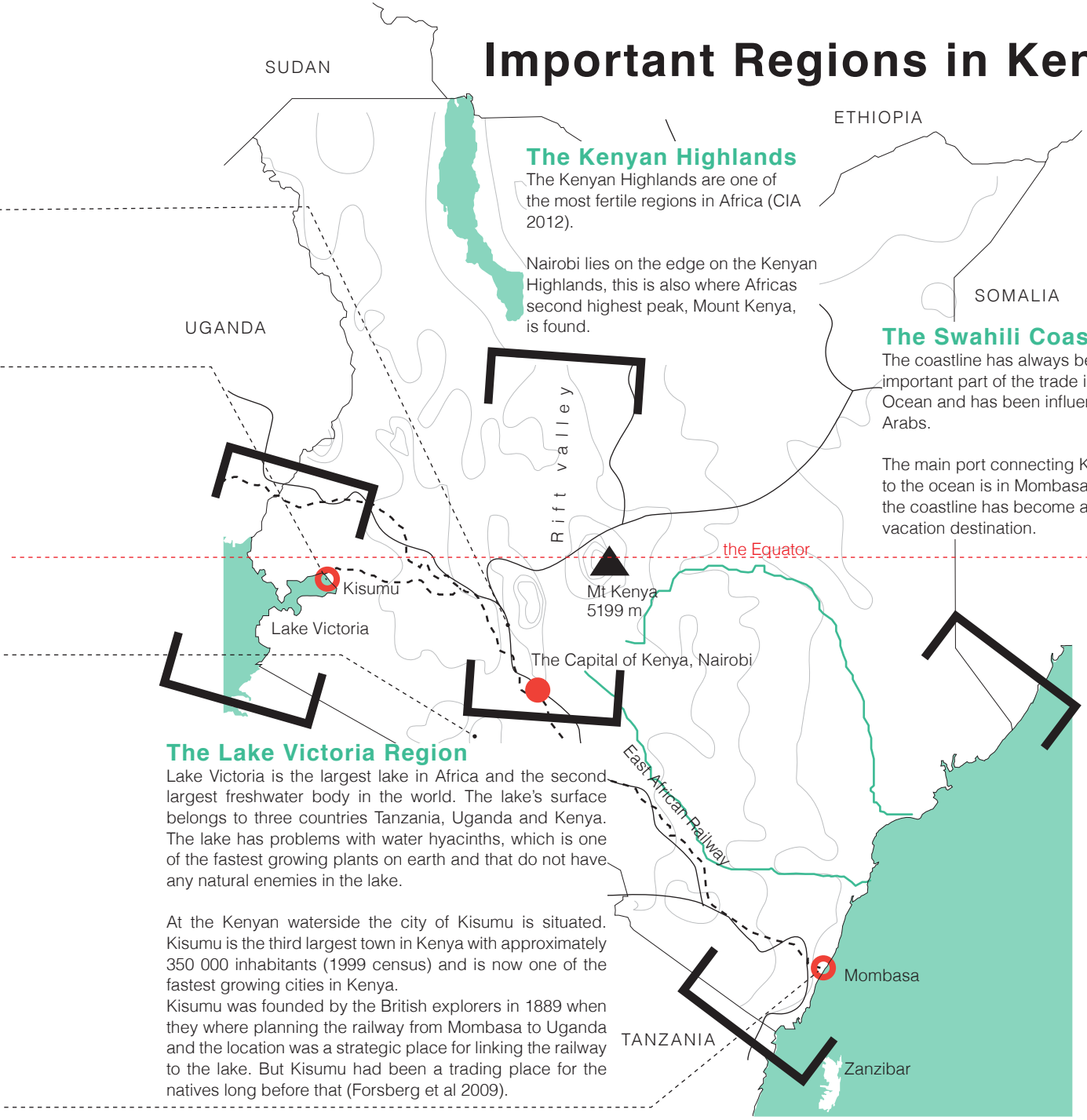

Rift Valley


Water hyacinths in Lake Victoria


Masai Mara National Park


Mombasa

Important Regions in Kenya



The Kenyan Highlands

The Kenyan Highlands are one of the most fertile regions in Africa (CIA 2012).

Nairobi lies on the edge on the Kenyan Highlands, this is also where Africas second highest peak, Mount Kenya, is found.

The Swahili Coast

The coastline has always been an important part of the trade in the Indian Ocean and has been influenced by the Arabs.

The main port connecting Kenya to the ocean is in Mombasa. Today the coastline has become a popular vacation destination.

The Lake Victoria Region

Lake Victoria is the largest lake in Africa and the second largest freshwater body in the world. The lake's surface belongs to three countries Tanzania, Uganda and Kenya. The lake has problems with water hyacinths, which is one of the fastest growing plants on earth and that do not have any natural enemies in the lake.

At the Kenyan waterside the city of Kisumu is situated. Kisumu is the third largest town in Kenya with approximately 350 000 inhabitants (1999 census) and is now one of the fastest growing cities in Kenya.
Kisumu was founded by the British explorers in 1889 when they where planning the railway from Mombasa to Uganda and the location was a strategic place for linking the railway to the lake. But Kisumu had been a trading place for the natives long before that (Forsberg et al 2009).

History of Kenya

Tribal movement and the Arab trade

Fossils have been found in East Africa that suggest that protohumans roamed the area more than 20 million years ago. Recent finds near Kenya's Lake Turkana indicate that human ancestors lived in the area 2.6 million years ago (U.S. Departments of State 2012).

Many tribe movements have taken place to form what are now the Kenyan people. The first major tribe movement were the Cushitic-speaking people that came around 2000 BC from what today is Sudan, South Sudan, and Ethiopia. The Cushitic-speaking people are today the smallest group of tribes (U.S. Departments of State 2012).

Around 100 AD trade begun with the Arabs. This was a result of Kenya's proximity to the Arabian Peninsula and by 800 AD Arab and Persian settlements sprouted along the coast (U.S. Departments of State 2012). The Arab and Persian city-states controlled the trade in the West Indian Ocean and had no interest in moving into the mainland. The goods they sought were gold from the mines of Rhodesia, ivory, slaves, tortoise shell and rhinoceros horn and this could be bought by the natives. In the 16th Century the Arabs got competition from the Portuguese that wanted control the sea route from Asia to Europe (Hallett 1970).

During 1000 AD, Nilotic and Bantu tribes moved into the region. Swahili is a Bantu language with significant Arabic vocabulary and was developed as a trade language in the region (U.S. Departments of State 2012).

Bantu tribes originated from West Africa and are represented in Kenya today by Kikuyu, Kamba, Luhya, Kisii and Meru tribes. Nilotic tribes originated east of the Nile, in what is now South Sudan and are represented by Luo, Maasai and Kalenjin tribes.

Colonization (1895 - 1963)

The British began to explore East Africa in the middle of the 19th Century and in 1895 they established the British East African Protectorate. The Protectorate promoted settlements of the fertile central highlands by Europeans, displacing the Kikuyu, Maasai and Kalenjin from their land. In 1920 Kenya officially became a British colony (U.S. Departments of State 2012).

Conflicts between especially the Kikuyu tribe and the Europeans grew from their displacement. When the Second World War ended the opposition against the colonial power was established as the Mau-Mau movement. Between the years 1952 to 1959 Kenya was in a state of emergency. The uprising mostly took place in the highland and tens of thousands of natives where killed along with about 650 British. The years of conflict ended in liberation 1963 (U.S. Departments of State 2012).

The ruling systems used in Africa before colonization were based on tribes having consultations between the village elders, with the objective to reach an agreement. In small societies it is important that there are not any conflicts that can lead to the breakup of the community. To prevent this it becomes better to compromise than to win over an opponent (Dowden 2010).

Kenya Today

Politics after Independence (1964 - present)

Kenya's fist president was Jomo Kenyatta, representing Kenya African National Union (KANU). Kenyatta had before Kenyan independence been struggling for liberation in the Mau-Mau movement. After independence he was elected president in 1964. Kenyatta ruled until his death in 1978, when Daniel Toroitich arap Moi took over (CIA 2012).

2.0

2.6 million years ago, hominids lived in the area

800 AD Arab and Persian settlements sprouted along the coast

1895 establishment of the British East African Protectorate

Cushitic, Nilotic and Bantu tribes moved into the region

16th Century the Arabs got competition from the Portuguese

1899 Nairobi was founded, Railroad from Mombasa to Uganda was constructed

1907 Nairobi became the capital of Kenya

World War I 1914-1918

1900

1910

Kenya was a one party state from 1969 to 1982 with KANU as the only ruling party. From internal and external pressure, politics where liberalized in the end of 1991 and Kenya became a multi party state. During the election in 1992 and 1997 the opposition failed to take the power from Moi. The elections was marred by violence and fraud (CIA 2012).

In 2002 Mwai Kibaki representing the multi ethnical party, National Rainbow Coalition (NARC) defeated KANU. They now had a new leader, Uhuru Kenyatta, who had replaced Moi after he stepped down (CIA 2012).

In 2005 the NARC became fragmented over the constitutional review process, and defectors joined in a new coalition, the Orange Democratic Movement (ODM). They overruled the government's draft constitution in a referendum 2005 (CIA 2012).

In 2007 Kibaki was reelected This brought charges of vote rigging by the opposition, ODM lead by Raila Odinga. This ended in two months of violence where 1 500 people died. In the beginning of 2008, after UN-sponsored talks, a powershare was arranged. Odinga got a position as a prime minister in the government (CIA 2012).

In 2010 Kenya adopted a new constitution through a referendum. The new constitution eliminates the role of prime minister (CIA 2012). The next election was planned in August 2012 but has been postponed to March 2013 (Macharia, J. 2012).

Kenyan politic parties are to a large extent divided by ethnical groups.

Land Rights

The land tenure system in Kenya is a combination of English property laws and African customary laws. During the colonization, large areas of land were seen as "under utilized" and were deemed by the British Crown. This resulted in indigenous people being displaces (Alam et al 2005).

Later when Kenya became independent, the land that had been claimed by the British Crown was inherited by the new government. The public land was later used as a political tool. Leaders and politicians allocated land to gain patronage as well as appropriate land for themselves. This became known as "land-grabbing" and was at its height in the 1990s (Alam et al 2005).

The illegal allocation of land has led to the creation of absentee slum-lords or building owners in many informal settlements. They collect rents and are often in close relation with influential political people. They are often against upgrading projects because of the fear that they will lose an income source, it is a lucrative business (Alam et al 2005).

Current issues

The current environmental problems in Kenya are water scarcity and deforestation.

Kenya is covered by 3% forest; this is half of what it was 30 years ago. Lost of forest have aggravated situation when natural disasters occur and lead to erosion, silting of dams, desertification and flooding (Federal Research Division 2007).

Kenya is dependent on hydropower, but this puts pressure on the water recourses and destroys the biodiversity. The water recourses are also polluted by chemicals from the agriculture industry and urban- and industrial areas. Water shortage will be a problem in the coming years (Federal Research Division 2007).

Kenya's border to South Sudan is unclear and has been since colonization, the land is named the "Ilemi Triangle". Kenya also has problems at the border to Somalia to prevent clans and militia to cross the border. It used to be open for nomadic pastoralists (CIA 2012).

Refugees come to the country from Somalia (522 000), Sudan (20 528), Ethiopia (34 000) and the Democratic Republic of Congo (11 500). Kenya also has 250 000-350 000 internally displaced persons (IDPs) resulting from the post-election violence in 2007 and KANUs attacks on opposition tribal groups in the 1990s (CIA 2012).

Demographics and health

The population in Kenya was 41.6 million, 2011. Most of the population growth took place after the1960s. In 2010, 24% of the population lived in urban areas and 76% (UNDESA 2012) in rural areas. The urbanization is increasing and is likely to follow the same pattern as developed countries. In Sweden most of the population growth took place before the 1950s and 85% of the population lived in urban areas 2010 (UNDESA 2012).

A major challenge in Kenya is poverty, with 46% of the population living below the poverty line. People living below the poverty line decreased between 2000 and 2006 from 56% to 46% and have remained the same until 2009 (UNDP Kenya 2009). In the 1970s 29% of the population lived under the poverty line (Federal Research Division 2007).

Most affected by poverty are the youth, which is 60% of the population. The youths are also affected by the widespread unemployment and HIV/AIDS; this stress can sometimes lead to violence (UNDP Kenya 2009).

Kenya has long suffered from tropical diseases, especially malaria and tuberculosis. Since 1984 HIV/AIDS has also become a major problem. Kenya is also the country with most traffic accidents in the world (Federal Research Division 2007).

In 2011, 1.6 million people in Kenya were living with HIV and 59% of them were women. The same year 49 126 people died in AIDS and 104 137 became infected by HIV (NACC and NASCOP 2012). The prevalence of HIV/AIDS is higher in urban areas than in rural areas (UNDP Kenya 2009).

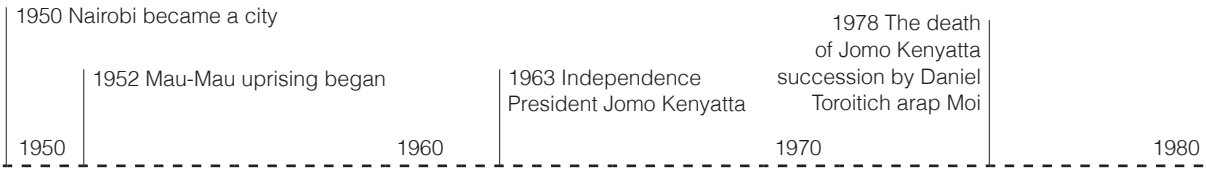
Estimates of the Kenyan literacy range from 75% to 80%. The literacy for women is lower than for men (Federal Research Division 2007).

Since the 1970s the child birth per woman have gone from 8 children to 3 - 5 children. The mortality rate for children under 5 years has increased during the same period (Federal Research Division 2007).

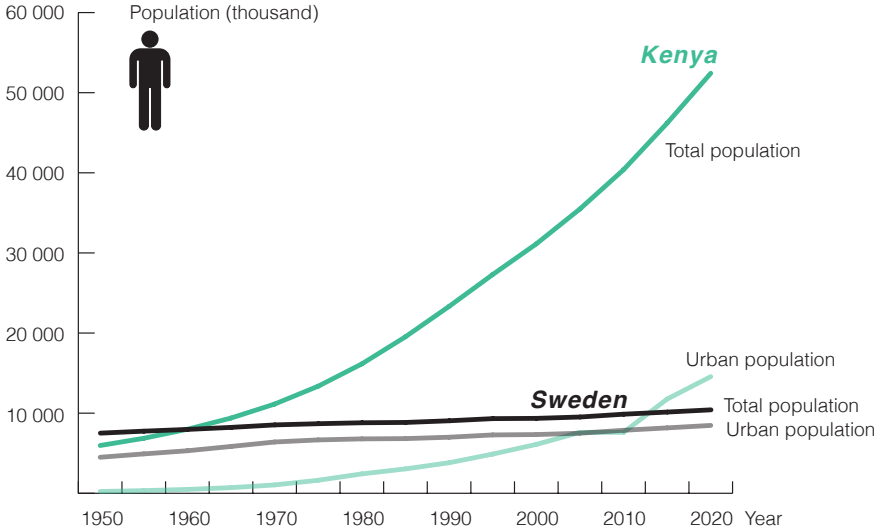
Economy and trade

Kenya's economy has been one of the worst in Africa, with a decline in GDP growth since independence and a bottom low during the 1980s. But since the beginning of the year 2000, the growth has increased (Federal Research Division 2007). The public debt was estimated to be 50.7% of the GDP in 2011(CIA 2012).

Declining economic growth combined with population growth has lead to reduced incomes and unemployment, which has lead to poverty. The disparity of wealth has increased. The top decile of the population lives on 37-42% of the income and the low decile lives on 1-2% of the income (Federal Research Division 2007).



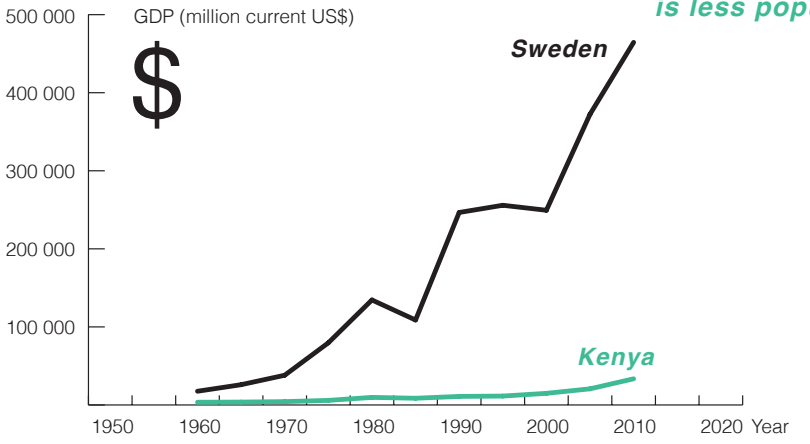
Population and Urban population



Source: UNDESA 2012

Sweden has a higher GDP than Kenya and is less populated

GDP per capita



Source: World dataBank, World Development Indicators (WDI) 2012

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1990 | 1992 Kenya went from One party-system to Multi party-system | 2000 | 2002 First election when there was a shift in ruling party, Kibaki | 2007 Election violence | New constitution | 2010

Kenya is a marked-based economy, with some state owned enterprises. The country also has a liberalized external trade system (Federal Research Division 2007).

Kenya's natural resources are the agriculture and the wildlife that draws tourists, but these are industries vulnerable to the cycles of boom and bust (Federal Research Division 2007).

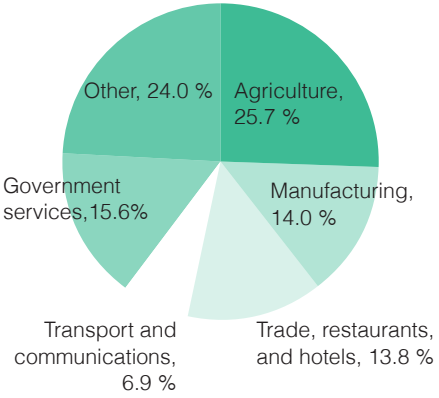
The agriculture production, including forestry and fishing, employed 75% of the population in 2006, this can be compared with 80% of the population during the 1980s. Cash crops are tea, coffee and horticulture produce. The main producers are Kenyan owned farms, where the land has been divided from old European estates since colonization (Federal Research Division 2007).

Kenya is the most developed country in East Africa. Nevertheless did the manufacturing industry only account for 14% of the GDP in 2004. The reasons for this are shortage of power , lack of transportation infrastructure, corruption and cheap imports. Half of the investments in the industrial sector were foreign, with the UK and US as the main investors (Federal Research Division 2007).

The corruption in Kenya is widespread, on Transparency International world ranking index, 2012, Kenya is on ranking 113 of 174. Corruption is based on poor governance and has a negative impact on the economic growth and trust in the government.

The high level of corruption in Kenya is one of the main reasons why money ends up in bank accounts in Europe. It is a society where corruption, to a certain level, has been accepted and is a way of life. If there is a chance of getting some money, it has to be taken; "everyone" does it and the expression "it is our turn to eat" is used for describing the attitude and is commonly used by the elite in the society (Wrong 2009).

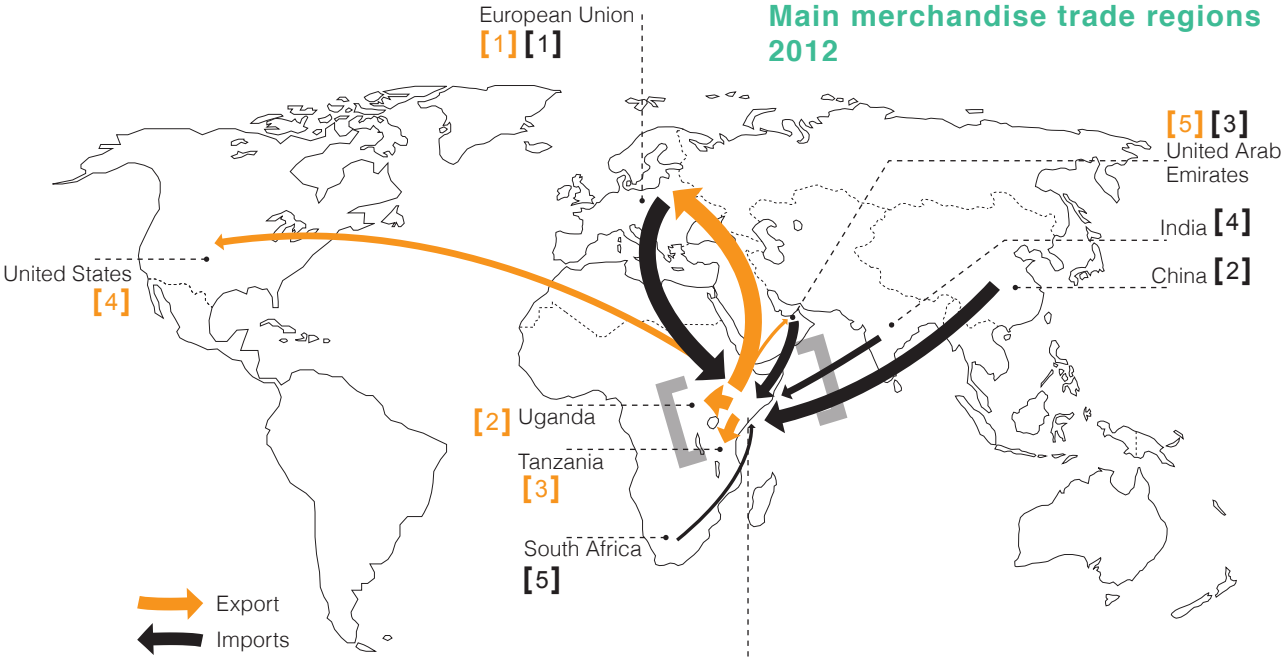
GDP composition by sector, 2004



Source: Federal Research Division 2007

71% of the total urban population in Kenya lives in informal settlements (MoNMD 2011)

Main merchandise trade regions 2012



Main industries in Kenya

Tourism ***Tea and Coffee*** ***Fishery*** ***Horticulture***

01 City centre, view from east

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Nairobi

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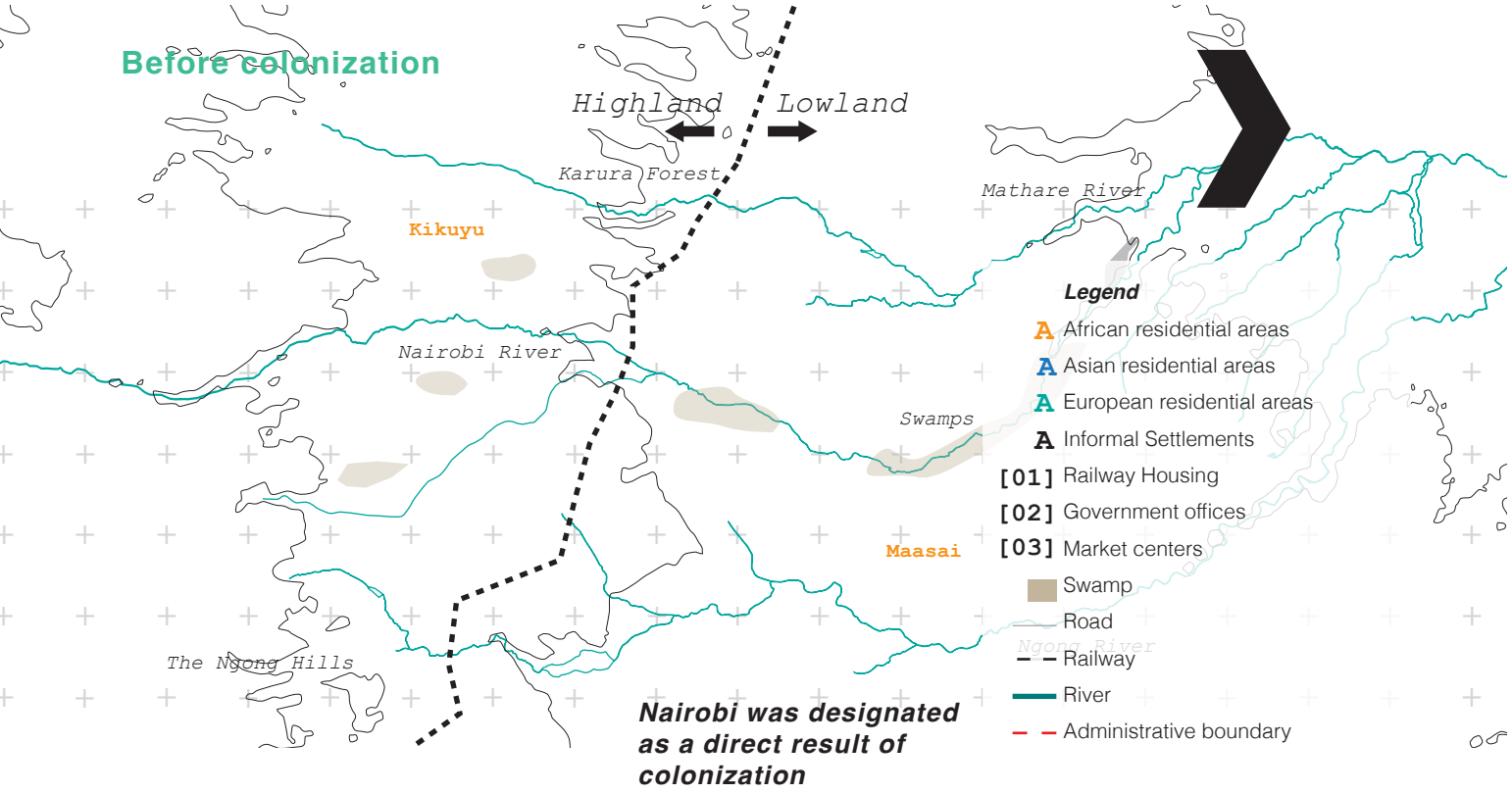


Nairobi climate and geography

Nairobi is located 1,2 degrees south of the Equator. The climate is temperate tropical with cool mornings and evenings. The mean daily temperature ranges between 12 and 26°C (CCN et al 2007). Nairobi is situated on the southeast border, of what is considered to be one of the most fertile lands in Africa, The Kenyan Highlands (CIA-The World Factbook 2012).

The altitude varies between 1 600 to 1 850 meters above sea level. The western part of the city is the highest and the eastern city is generally flat, 1600 meter above see level. This is the direction of the rivers streams in Nairobi (CCN et al 2007).

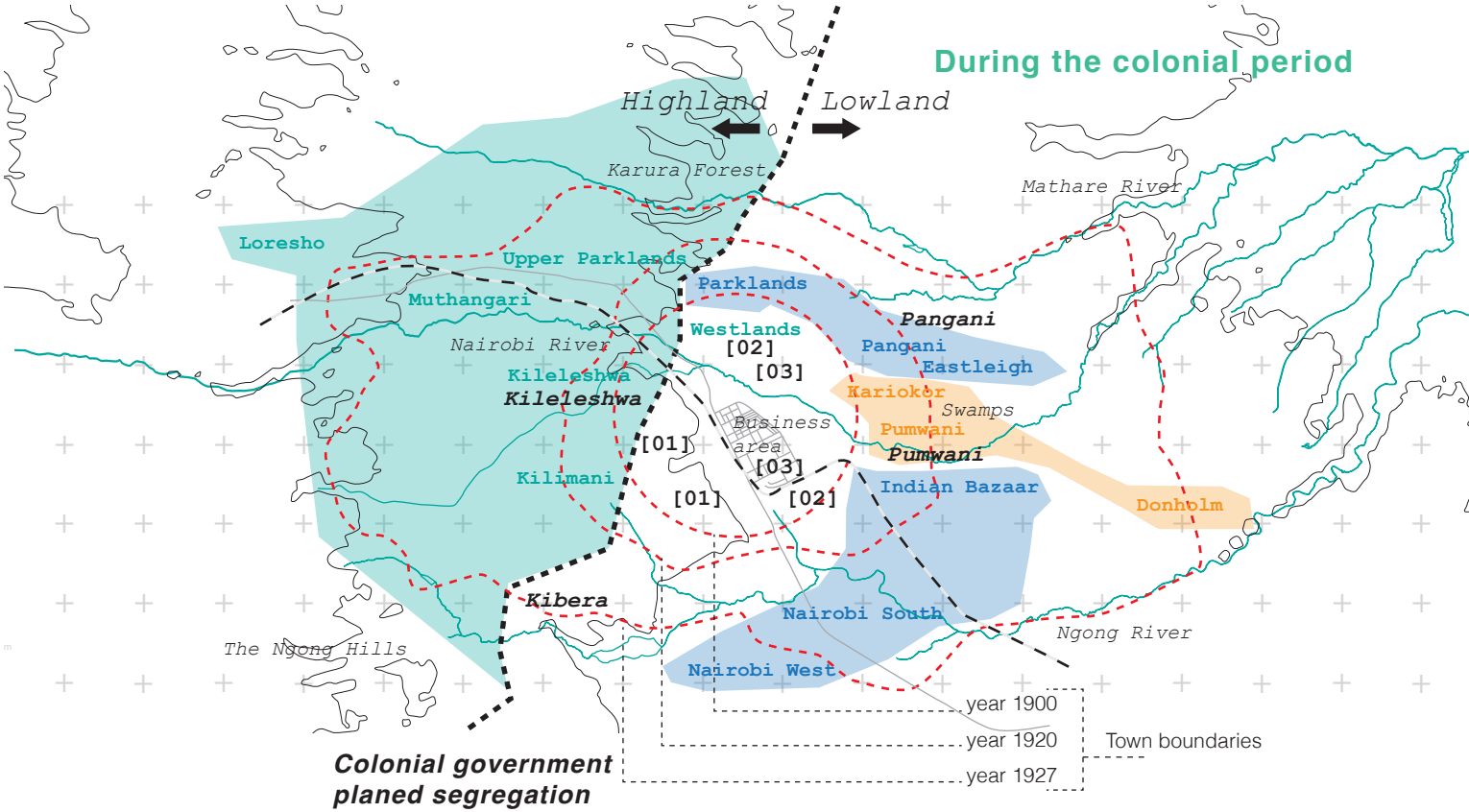
Nairobi is situated on volcanic rock and when this has weathered it has become red soil. The city is adjacent to Rift Valley, and because of this experiences minor seismic activity.

Colonization

Before the Europeans arrived in the area it was inhabited by Kikuyu and Maasai tribes. The Kikuyu used the land north and west of Nairobi for farming and the Maasais used the land for grazing animals (CCN et al 2007).

Nairobi was established as a direct result of colonization. In 1899 the European settlers constructed the railway from the coast to the Kenyan inland. When they reached the cool climate half way through the country, they set up base camp, and this is where Nairobi is today (Mitullah 2003).

The settlers came from the “Kenyan Ugandan Railway Company” (KUR), which moved their headquarters from Mombasa to Nairobi in 1905. Nairobi became the center for the British East African protectorate, hub for commerce and business, and the link between East African and the



colonial power. At this time Nairobi was 18 square kilometers and had a population of 10 000 people (Alam et al 2005). The architecture consisted mainly of railway buildings and separate housing areas for Europeans and Indians (Mitullah 2003).

Asians from India were brought in by the Europeans to build the railway. They had the knowledge for railway building and India was also a British colony at the time.

The town boundary was extended as Nairobi population grew (Mitullah 2003).

Spatial Segregation

When Nairobi was established and the British claimed land, native Africans where displaced. With no availability of land and the introduction of capitalist economy Africans were forced to work for the colonial power. Most work was for high-income groups as domestic servants or as agriculture labor, but some worked in industries or with commerce. The salaries were low and not enough for food, clothes and adequate housing. Consequently informal settlements grew around Nairobi and close to high-income areas. Between 1900 and 1920 nearly all Africans in Nairobi lived in informal settlements in Nairobi (Olima 2001).

The spatial segregation that was government sanctioned divided Nairobi in distinct areas based on ethnicity. The colonial officers, senior railway officers and other European settlers lived in the Hills in the west part of Nairobi (Olima 2001).

Asians that had been discharged from the KUR lived and had businesses close to the railway station, the Indian Bazaar (Olima 2001).

Africans that worked for the KUR lived in railway quarters. Others lived in informal settlement, “Native locations” that were spread over the town depending

on work opportunities. In 1923 the government official allocated the first “African Location”, Pumwani in the east of Nairobi. This is where the African residential areas grew (Olima 2001).

The attitude towards informal settlement during the colonial period was demolition or neglect. The government did not want to provide public housing with the “risk” of an influx of Africans to the town (Olima 2001).

Nairobi at independence

After independence when the new government removed the restrictions on Africans migration from rural to urban areas the population in Nairobi grew (Olima 2001).

The city boundary was extended in different periods and the last extension was after independence. The city boundary then covered approximately 690 square kilometers (Mitullah 2003). The boundary move was also one of the reasons the population increased.

The segregation remained although it was not reinforced by the government. Most low-income groups lived in informal settlements (Olima 2001).

Strategies towards informal settlements

Demolition and Public Housing, 1960s and 1970s [D+Ph]

During the colonial period the approach towards informal settlements was neglect or demolition. In 1963 there was a large immigration to the urban centers by native Africans. This was because the restrictions on movement that the colonial government had introduced were lifted. Natives came to the urban areas in search for employment. The attitude towards informal settlements after independence by the new government, was continued neglect. An acceptance grew for the areas, but without any attempts to improve the settlements (Olima 2001).

Later, Kenyan government recognized the housing shortage with the National Housing Policy in 1966/67. The plan was ambitious, with the aim that every Kenyan family should be able to have an acceptable urban housing. The units would be two rooms, a separate kitchen and toilet, with not more than five people living in the unit. All other housing was demolished. This resulted in many displacements and growing informal settlements (Alam et al 2005).

The houses that where actually built did not meet the demands, and were only affordable to medium and high-income groups (Alam et al 2005).

Sites and Services, 1970s [Ss]

After the failure of public housing the new strategy in the 1970s was to provide low-income housing with basic services and to low-cost loans. Plots were often in the periphery of the town (Ekdale 2011).

The largest project in Nairobi of this type was Dandora Community Development with the aim to create 6 000 serviced plots. The World Bank saw this as a success because the cost was recovered. Later research showed that it did not actually meet the cost recovery and that the target group abandoned the area (Alam et al 2005). These project areas were located far away from employment and were too expensive for the targeted groups. They were instead used by the middle-class (Ekdale 2011).

During the 1970s and 1980s Nairobi experienced a real estate boom (Ekdale 2011).

[Ea] ***Enabling approach,1990s***

Enabling approach took place during the late 1980s and the beginning of the 1990s and was spearheaded by international agencies, especially the World Bank. The approach focused on the government creating incentives and policies that fostered and facilitated improvements in housing through NGOs (non-governmental organizations) and the private sectors (Alam et al 2005).

One of the largest projects implemented with this approach in Nairobi was Mathare 4A. The aim was to improve buildings, infrastructure, services and facilities for 22 000 people. The result was mixed; there was no displacement, which was a good. The major efforts went to mediation between the structure owners and tenants. It was positive that a large effort was made for this, but the end result was building owners claiming their right in court in 1999 (Alam et al 2005).

Today in Nairobi

In the Draft to the Spatial Plan for the Nairobi Metropolitan Region (MoNMD 2011), a mix of approaches is suggested to meet the housing shortage; new developed areas, upgrading and intensification through redevelopment of existing housing. Actors involved are above all the private sector, but also public agencies and cooperation societies. Informal settlements should either be relocated or upgraded depending on the land, and other parameters (MoNMD 2011).

In the Draft Plan supports the development of local materials and building techniques, but the traditional houses in earth are classified as temporary.

Housing Strategy from the Spatial Plan for the Nairobi Metropolitan Region (MoNMD 2011)

Housing Type Development	***Agencies***
Slum • In-situ (location specific) Rehabilitation • Relocation/Reconstruction • Up-grading	Public Agency Private Agency Co-op Society
Houses on Independent Plots & Redevelopment	Public Agency Private Agency
Group Housing	Public Agency Private Agency Co-op Society
Employer Housing	Government
Unplanned Areas Infill	Co-op Society Residents Association Private agency
Other Housing areas, Up-gradation of Old areas/ Traditional areas/ Urban-rural fringe areas	Public Agency Private Agency Co-op Society

Legend

- A African residential areas
- A Asian residential areas
- A European residential areas
- A Informal Settlements
- Landmarks
- Movements to and from settlements
- City centers
- Informal Settlements
- Industrial areas
- Airport
- Road
- Railway
- River
- Grid, spacing
- 2 kilometers

15

16 Limuru Rd
Advertisements establishing commercial culture, and a proof of purchasing power

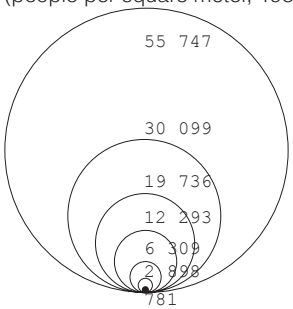
20 Eastlegih S.
Low- and middle-income area, most of the Somalian refugees live here

19 Wakulima market

17 Kariobangi
Houses painted with advertisement, the house owner gets the paint for free

18 Donholm
Middle income housing being built

Population density
(people per square meter, 1989)



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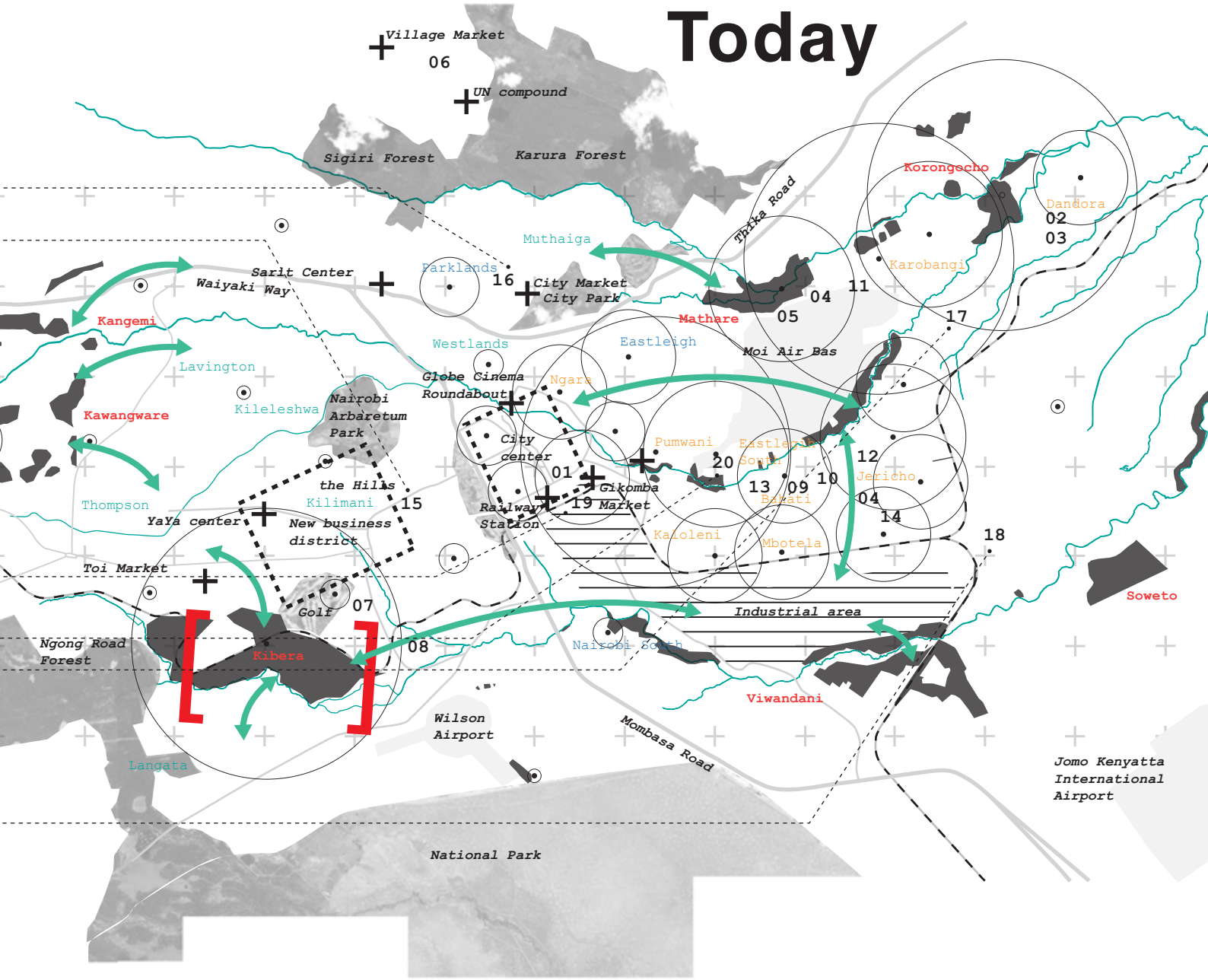
Nairobi Today



Nairobi Today

The spatial segregation in Nairobi remains, but not as ethnical segregation, instead it has been replaced by socio-economic segregation.

Socio-economic spatial segregation, which is the reason for informal settlement developing on certain locations is determined by land qualities, employment opportunity and regulations. Land qualities can tempt people with good climate and geological conditions, or the land can be less suited for building because of landslides, flooding or other disadvantages.

The land use pattern in Nairobi is divided in five residential areas, the central business district and the industrial area. The west is the high-income area with a low density of people. The east is low- and middle-income area with higher density. Informal settlements are located mainly in the east part of the town and have the highest density of people (Mitullah 2003). Informal settlements are mainly of two types in Nairobi, squatter settlements and illegal sub-division on either government or private land.

In the northern part of Nairobi is the hilly forest, which makes the climate cool and lush with clean air. This is where the high-income group live, close to where many of them work, the UN complex and different embassies, which employ many foreigners. This is also where one of Nairobi's exclusive shopping malls is situated.

The high-income area stretches to the west of Nairobi where the nature is still hilly and lush. This is where Lavington is located, which is famous for being the home of the Kenyan elite. The eastern part of the city is also where some of the British colonial ancestors built their houses. Many informal settlements have developed around the wealthy areas providing them with household services. Kibera is located in the southern part of this area. To provide informal settlements with services, markets have developed, the area has Nairobi's largest market, the Toi market.

Nairobi National park creates a barrier to the semi-county area southwest and south of Nairobi. This area southwest of the city is called "Karen" after the Danish author Karen Blixen, who lived in the area in the beginning of the 20th century. At this time the area was still countryside. Since then the area has become more incorporated in Nairobi as the population and area have grown.

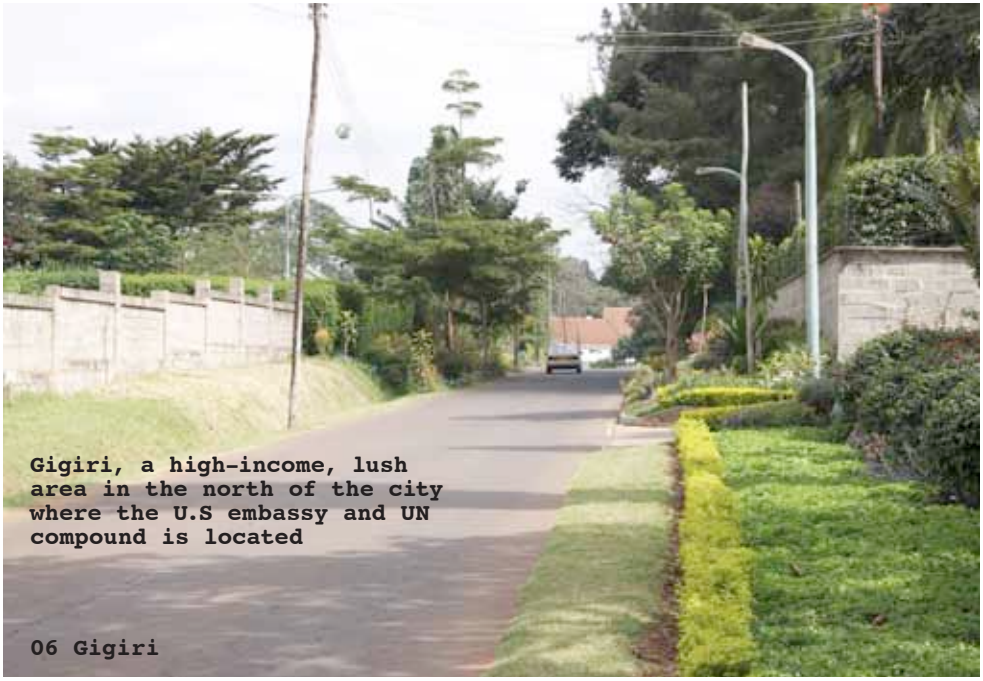
The area around the airport and south of Kibera has lately been developed with middle-income housing.

The east part of Nairobi is situated on flat land where rivers coming from the hilly west and north merge, making this area exposed to flooding. This is where most of the mid-income groups live. The area has commuting distance to employment in the town center, the industrial area and the north. Many approaches towards improving informal settlements took place here in the past, but improved houses and services made the houses too expensive for low-income groups, so the areas have been gentrified. This area was also home for the native Africans during colonization.

South of Nairobi's town centre is the industrial area. This has developed along the railway line, and lately Mombasa Road.

The town centre, also called the CBD (central business district) is the old part of Nairobi and today where most of the employment and services are. The first residential areas have grown around this location.

Nairobi is a hub between developed countries in Europe and North America, and countries in East Africa. This goes back to the colonial times and today Nairobi is a relatively safe and stable place for businesses and as a stop for tourists. This is evident when you travel through Nairobi, seeing the big commercial brands on skyscrapers, and walking through the central business district on a Saturday and hearing and seeing tourists with their backpacks and cameras everywhere.



Gigiri, a high-income, lush area in the north of the city where the U.S embassy and UN compound is located

06 Gigiri

07 Mbagathi Way

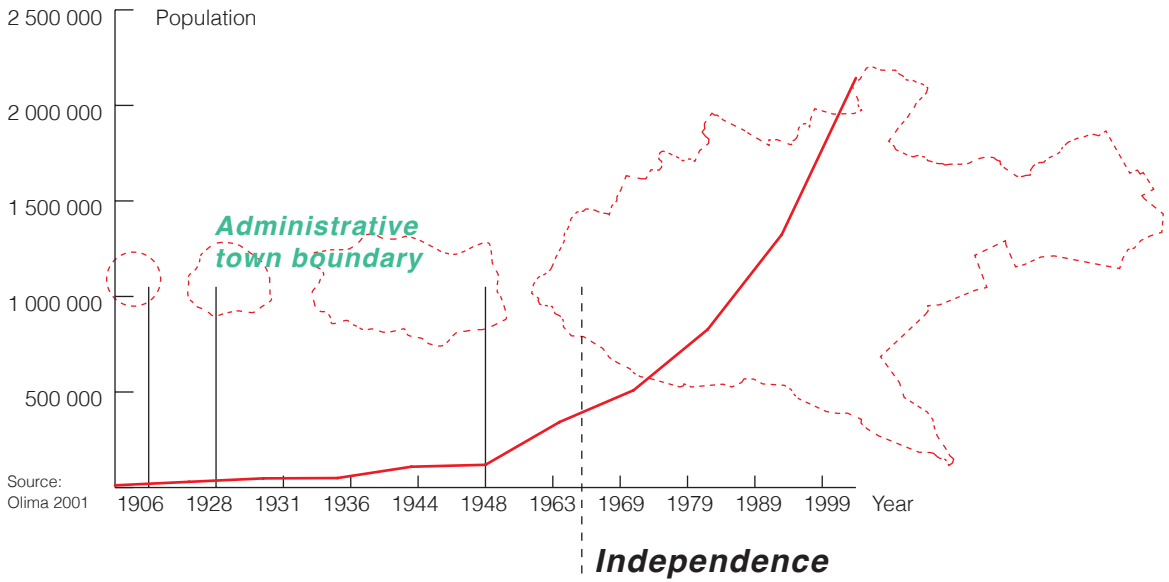
Empty half-built houses next to Kibera

08 Mbagathi Way

Steel huts built for an upgrading project

2.0

Nairobi population and city boundary growth



Infrastructure

Water resources are scarce in the metropolitan region of Nairobi. The groundwater resource has already been overexploited, therefore the surface water is the only option to develop (MoNMD 2011).

29% of Nairobis population have access to sanitation facilities (MoNMD 2011).

The sewage system covers 40% of the city and can only treat 50% of the wastewater that is generated (MoNMD 2011).

In Nairobi 65% of the employment is in the informal sector, which is 25% of the total employment in Kenya (MoNMD 2011).

High-income households account for less than 10%of Nairobi's households but occupy 64% of all residential land, while low-income households constitute 55 % of the population while occupying only 6% of the residential land in the city

Old workers housing

09 Shule Rd

10 Shule Rd

11 Huruma

12 Uhuru

13 Heshima Rd

Development projects

14 Rabai Rd

2.0

2.0

Kibera

The information in this chapter is based on field visits to Kibera and interviews with people living in Kibera and Nairobi.

2.0

Kibera

Kibera is located 5 kilometers from Nairobi city center. Kibera has an area of approximately 2,5 square kilometers with 170 000 to 270 000 inhabitants (Karanja 2010 and Marras 2009).

Kibera is separated from the south by Ngong River and to the west by the forest. Kibera is connected with the city center by roads going northeast and an alternative path is the railway line.

Kibera consist of approximately 13 villages which have different people densities. The village boundaries are not always clear, but often stretch along natural boundary such as paths, the railway, rivers or streams. Most villages are dominated by an ethnic group.

In the middle of the 1970s the governments sanctioned housing estates, for example Ayany and Olympic. The have now become a richer part of Kibera (Ekdale 2011).

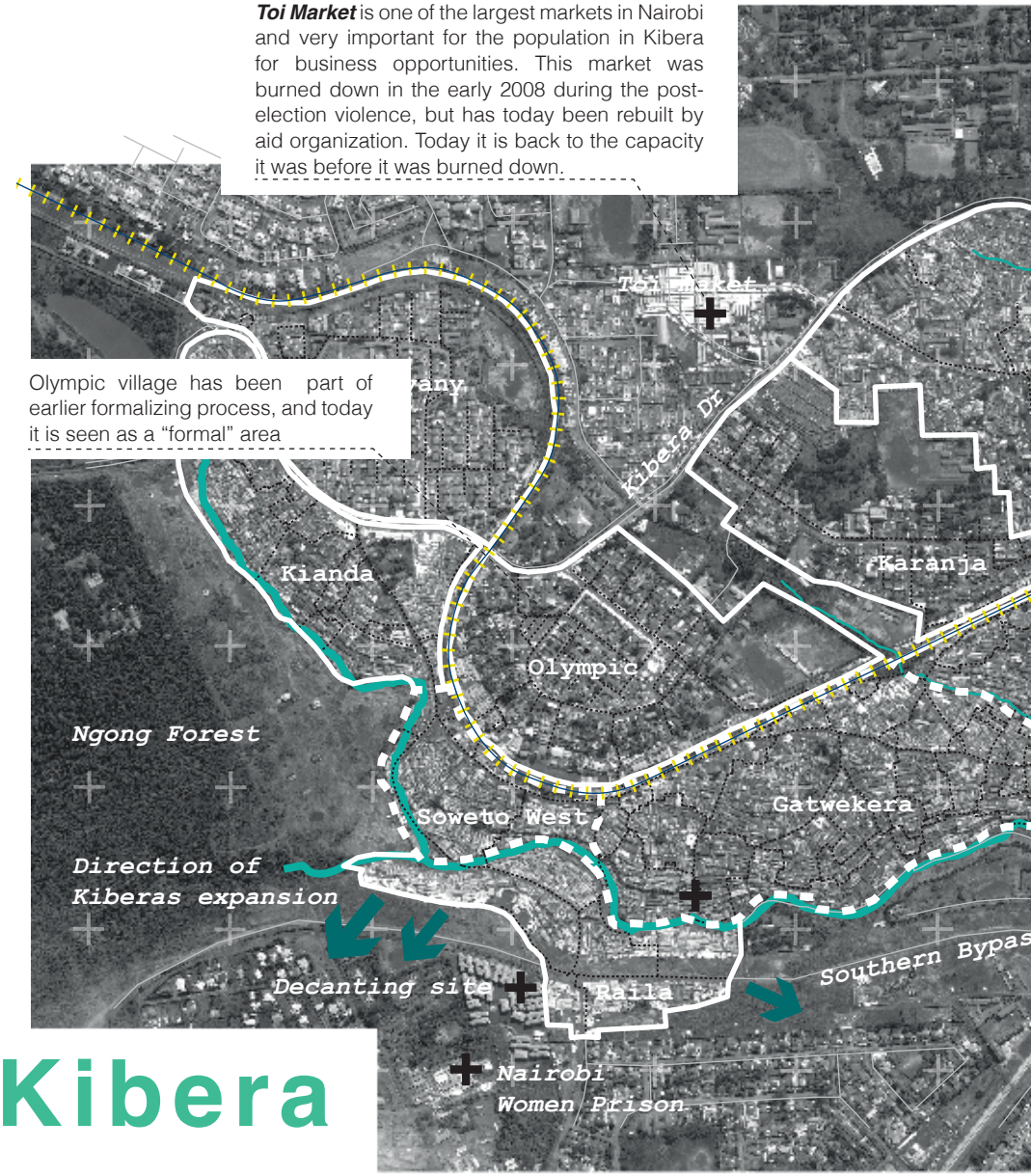
One of the reasons for Kibera's growth is its proximity to employment. Kibera is surrounded by wealthy neighborhood where there is a need for services. It is on walking distance from the industrial area, which is reachable along the railway tracks (Mitullah 2003).

Legend

- Villages
- Villages that are highlighted in this chapter
- Landmarks
- Road and paths
- Railway
- River
- Grid, spacing 250 meters

Toi Market is one of the largest markets in Nairobi and very important for the population in Kibera for business opportunities. This market was burned down in the early 2008 during the post-election violence, but has today been rebuilt by aid organization. Today it is back to the capacity it was before it was burned down.

Olympic village has been part of earlier formalizing process, and today it is seen as a "formal" area



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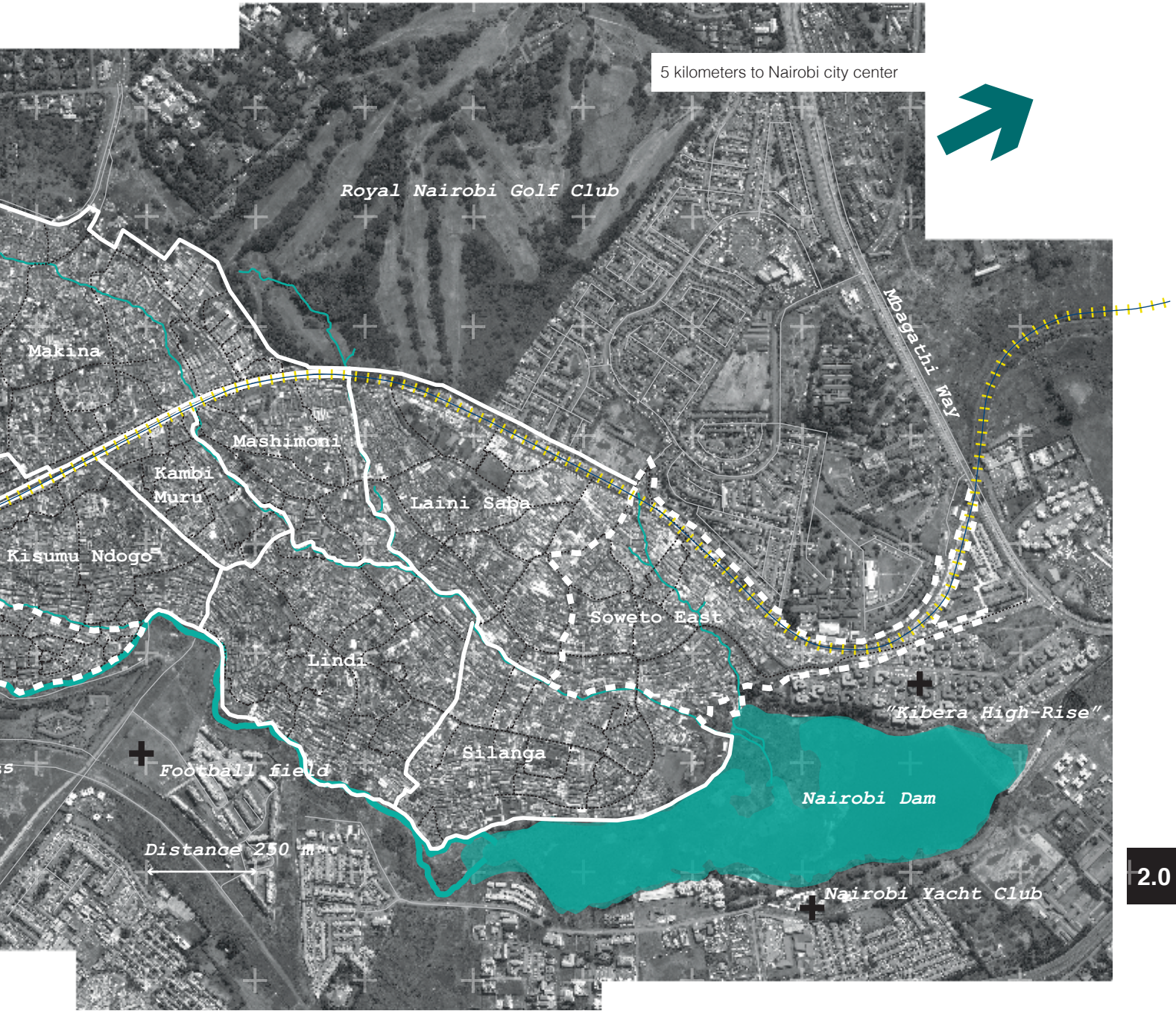

5 kilometers to Nairobi city center
Royal Nairobi Golf Club
Mbagathi Way
Makina
Mashimoni
Kambi
Muru
Laini Saba
Kisumu Ndogo
Soweto East
Lindi
"Kibera High-Rise"
Silanga
Football field
Nairobi Dam
Distance 250 m
Nairobi Yacht Club

2.0

History of Kibera

Kibera was established in 1904 when Sudanese soldiers, Nubians, that had served in the British East African Army, “the King’s African Rifle (KAR)” retired, and were allocated land where Kibera is today. At this time, Nairobi was divided in zones based on ethnicity. The Sudanese did not belong to the “native zone” and therefore needed an area to settle. In 1912, 300 soldiers were given permanent residence, rent free (Ekdale 2011).

The Nubians let the land to others that used it for housing and farming. This lead to tension between the Nubians and the authorities. In 1928, the control over Kibera went from the military to the civil administration, which kept less control, and the population in Kibera grew. In 1930 there were plans of demolishing Kibera, but this became too expensive and logistically difficult and was never realized. Instead, the government waited for the Sudanese soldiers to die so they could reclaim the land. The authorities did not provide any services, hoping that the situation would become unlivable and that people would move (Ekdale 2011).

At the end of the colonial period, 1950, the government became too preoccupied with the uprising of the Mou - Mou movement. This meant that many Kikuyus, who had been one of the main ethnic group, left Kibera. The influx of people now came from the western part of Kenya and consisted mainly of Lous and Luhyas (Ekdale 2011).

After independence the Kenyan government changed their attitudes towards Kibera. They began to give building permits and everything that was built without a permit was demolished. The permits were used to favour certain ethnic groups and as political patronage (Ekdale 2011).

Receiving a permit, building houses and letting them became a lucrative business, which persists today.

During the 1980s and 1990s, tension grew between landlords and tenants. They blamed each other for the poor state of Kibera. The tenants’ fear of getting evicted by the landlords grew and became larger than the fear of getting evicted by the government (Ekdale 2011).

At the post-election violence in 2008 Kibera was hit hard. Many houses were burned down and families with mixed ethnicity separated, because of the conflict between the two major ethnic groups, Lou and Kikuyu.

Infrastructure

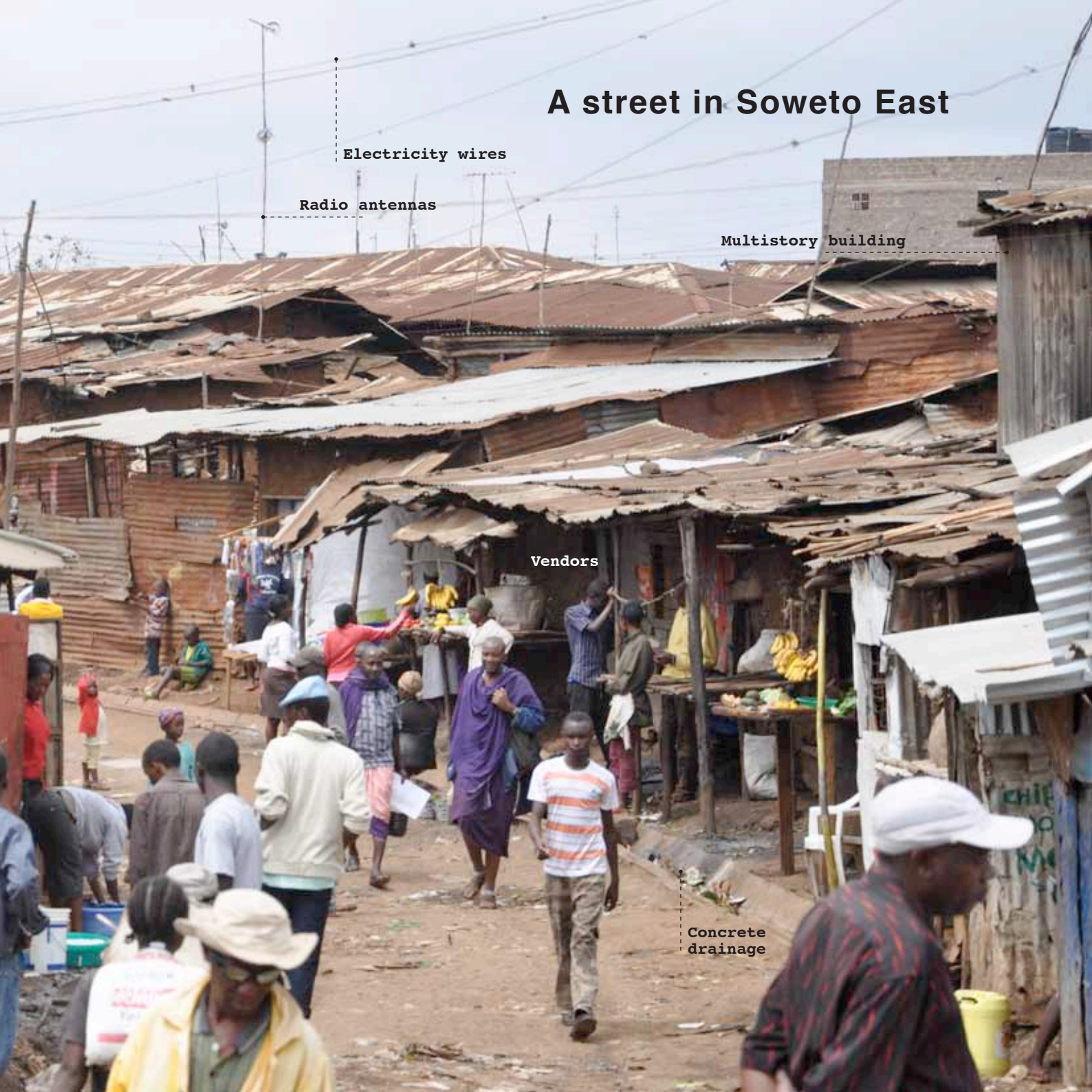
Paths and Roads

There is a distinct hierarchy in roads that have grown without any official planning. The paths that are most used are wider. Most roads are clay roads. When interventions have been made to improve the paths with paving, the main roads are often targeted. The smaller paths leading between housing blocks are narrower and often very steep going in a south - north direction. Vegetable and fruit stalls are common along these.

There are also internal paths in a group of housing, or as a corridor to rooms in a larger house. These can be narrow and have a very private feeling and are only used by people belonging to the area.

Most of the inhabitants clean the street around their neighborhood and shop owners clean around their shop.

A street in Soweto East



Railway
The railway functions as one of the main roads even though the train runs daily. It goes through the whole of Kibera and it takes nearly an hour to walk the distance from one corner to the other. The railway is also used for walking to the industrial area.

There is one train stop in Kibera but this is not used by the Kibera inhabitants because the train is too expensive. If inhabitants use the train they hang on the outside to avoid paying the fare (Ekdale 2011).

The railway line and railway reserve, 30 meters on each side, is owned by Kenya Railway Company. The houses that are located on the railway reserve are intend to be demolished.

When there have been riots in Kibera, the railway line has been damaged so that trains cannot pass.

A lot of garbage ends up on the line, but every now and then the Railway Company sends trains that collect the garbage.

Transportation
Other roads that are used to get to and from Kibera are Kibera Drive and Mbagathi Way. These roads are trafficked by "matatus" (mini buses operating as a type of public transportation) and buses.

Water
In Kibera "formal" water infrastructure does not exist, the water demand is filled by the water vendors that connect plastic pipes to the city's main water network. There are two legal pipes supporting Kibera with some of its water.

Vendors sell water from "kiosks" and most kiosks are owned by private persons, but some are owned by community based organizations (CBO´s) (KWAHO 2008).

The water runs in ad-hoc plastic pipes that have small diameters, with limited volume. The pipes easily burst are often close to sewage canals, which makes waterborne diseases a risk. Steel pipes would be better, both because they do not burst and they have a wider dimension that increases the volume. Steel is, however, worth more money and often get stolen (KWAHO 2008).

The water is collected in tanks that people buy from. Water is sold in 20 liter jerrycans which are transported to the households. A jerrycan cost between 2 to 20 Ksh depending on the availability of water. Average consumption of water is 1 to 20 liters per day per person. If Nairobi city council (NCC) is rationing the water supply the price goes up, and if pipes burst the price goes up. People in Kibera often pay 10 times as much for their water compared to high- and middle income areas in Nairobi (KWAHO 2008).

Transporting the water from the main network to the water tank

Water pipes

Storing of water before it is sold

Water tank

Different ways of transporting water

Wagons with jerrycans

"Flying toilet"

At the moment there is a drought in Kenya, and Nairobi has problems with water infrastructure. This leads to shortage of water, which results in higher prices.

Sanitation

A study on Population and Health Dynamics in Nairobi's informal settlements showed that the lack of toilets is the main reasons for health related problems. This was followed by poor drainage, lack of water and lack of health services (Mitullah 2003).

The government has up to recently not supplied Kibera with infrastructure and services because of its "illegal" status (KWAHO 2008).

There are no sewer toilets in Kibera. The most used toilets are regular pit latrines. They are self constructed and have many users, up to 150 people per toilet. There is a shortage of latrines, the space for new ones is limited and landlords are not willing to pay for the construction because of the insecure land rights (KWAHO 2008).

Pit latrines are difficult to empty because of the narrow and unpaved roads. Most are emptied manually and some are exhausted by the Vacutug, a special vehicle that has been developed for the conditions in Kibera. It is difficult to find space for the waste, and it is sometimes emptied in the open drainage along the road, or the pits are left for degradation (KWAHO 2008).

When Kibera gets flooded the pits overflow and the excrements pollute the waste water going through Kibera, This occurs more frequently in the areas close to rivers and the contaminated water eventually ends up in Nairobi Dam (KWAHO 2008).

The landlords that build houses do not provide sanitation facilities. The toilet blocks provided by aid organizations usually cost money and some have been taken over by landlords for exclusive use by their tenants.

The lack of adequate latrines have forced people to use "Flying toilets", which is a common way of defecating into a plastic bag and then trowing it away. This is used especially during nights when it is dangerous to go outside (KWAHO 2008).

This way of going to the toilet is something people are embarrassed by. They know it is bad for the environment and spreads diseases.

Sewer

The are few man-made sewers in Kibera. Some streams function as sewers and along the main roads there are sewage channels that are dug and sometimes reinforced by concrete. The channels eventually end in the river and dam, which is very contaminated (KWAHO 2008).

The sewage consists of liquid from bathing, washing clothes and utensils, and sometimes from overflown pit latrines. (KWAHO 2008).

There are sometimes problems with sewage water running trough Kibera from the surrounding neighborhoods or leaking from pipes that go through Kibera. These are usually not repaired because they are in an informal settlements.

Solid waste

The majority of the waste in Kibera is non-organic. Organic waste is re-used in different ways, for example as animal food. There are no collection points for solid waste. Therefore waste ends up at the railway, in open drains,pit latrines or gets burned (KWAHO 2008).

Energy

The electricity used in Kibera comes from the Kenya Power and Lightning Company (KPLC) and is usually illegally tapped from the network. Some aid organizations have provided street lights at certain places and airport lights have been built.

Charcoal or kerosene is used for cooking.

The most common way of cooking is over an open fire

Housing

When Kibera was established most of the houses where of Swahili type with a U - shaped form. During the 1980s when the subletting increased, the rectangular single - block became cheaper and increased (Ekdale 2011).

The average house in Kibera is 3 by 3 meters. The walls are mostly made of earth, sometimes covered with concrete. The roofs are made of corrugated iron and the floors of concrete or earth. There can be up to 7 people living in one of these houses. Most people pay between 400 - 1200 Ksh for a one room house. The price depends on the location and quality of the house.

Most of the people in Kibera are tenants, they rent their houses from landlords. Approximately 10% of the population own their houses, usually people that have lived in Kibera for a longer time (Nubian ,Kikuyu) . 90% of the population (Lou, Luhya, Kamba) rent the houses.

The landlords see themselves as owners of the land the houses stand on, which is a problem for upgrading schemes, when landlords claim compensation for loss of land.

Employment

Most people in Kibera work in the informal sectors (see vendor). Others work in the industrial areas or as servants to the high- and middle income areas around Kibera.

Vendors, the informal economy

The informal sector is economic activity that is not monitored and regulated by the government.

The informal economy takes place in the whole of Nairobi, but in the informal settlements, nearly all economic activity is informal. It provides employment and services that the community can afford, and is adapted to their demand.

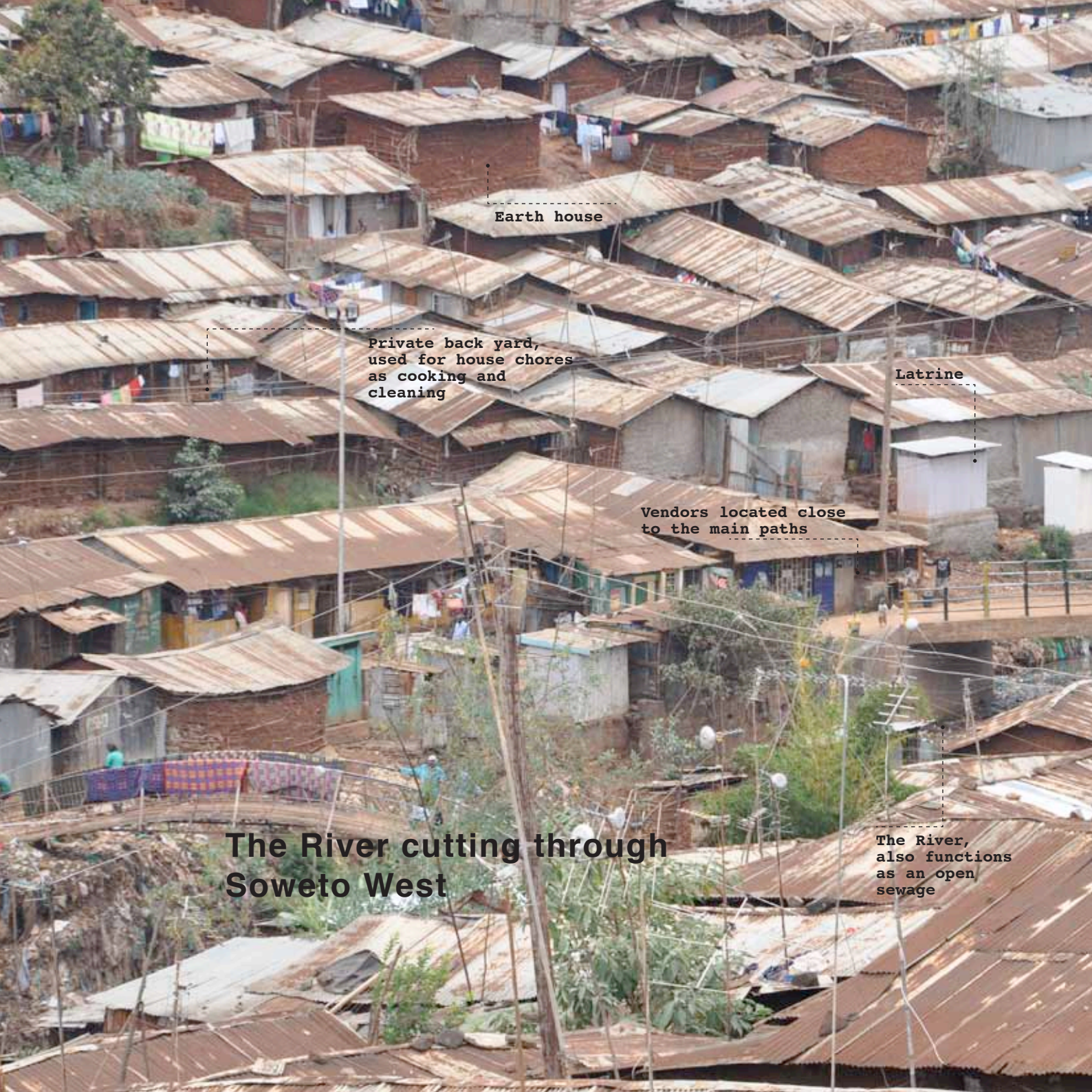
The informal economy is an alternative and complement to formal employment. The governments' attitude has changed in later years (on paper a least), and they are now supportive of the informal economy.

In Kibera most of the services that are needed are supported by different vending businesses. Most vendors have small convenient shops along the streets, selling vegetables or meat, but there are also vendors offering other services, such as charging batteries, hairdressers, barbershops and cinemas (small rooms with a television and DVD player). The diversity is endless and makes Kibera function like any other part of the city.

Education

There are two types of schools in Kibera, formal and non-formal. The formal are recognized by the Ministry of Education and the non-formal by the Ministry of Gender and Social Services (Map Kibera 2010).

There are approximately 200 non-formal schools in Kibera, including nursery, kindergarten, primary and secondary schools. Non-formal schools have fewer students than the formal, and the majority of the students are boys. The tuition fees range from 300-500 Ksh per term depending on if the school has a feeding program. Most schools have no books or playgrounds, and the teachers are often not trained. Students are taught by one teacher in one classroom, irrespective of age. These schools are often more flexible than formal schools concerning age of enrollment and student uniforms. Many non-formal schools are run by religious institutes, CBOs or NGOs (Map Kibera 2010).



The River cutting through Soweto West

There are fewer formals schools in Kibera than non-formal and these are densely populated, approximately 80 students per classroom and teacher. The teachers are always trained. The formals schools are free but the students have to pay for admission, food and labour for special staff (cook, guard etc).The formal schools have books and playgrounds. The are only two formal secondary schools in Kibera and these cost 5000 Ksh per term. There are also two schools for deaf and dumb and many schools for technical training such as mechanical work, carpentry, hairdressing, tailoring, computer skills and masonry (Map Kibera 2010).

Health

Many heath problems in Kibera are associated with the quality of water and sanitation. Some of the most common diseases are malaria, diarrhoea and intestinal worms (KWAHO 2008).

Malnutrition and HIV / AIDS are also large problems.

There are a few public healthcare facilities in Kibera, most are owned by NGO´s, religious institutions and private owners (Map Kibera 2010).

Actors involved in Kibera

The government owns the land in Kibera and is collaborating with UN-HABITAT on upgrading programs. Most interventions are lead by non-governmental (NGO) and community based organizations (CBOs), which often are connected and sponsored by international organizations. There are also many faith-based organization, most of the inhabitants in Kibera are religious.

Most interventions in Kibera are equal to money spent on the community, therefore most projects are received with positivity by the inhabitants, and seldom with criticism, which is sometimes needed for interventions to be efficient and to have a long-term perspective.

[Residents]

Marry-go-round

Marry-go-round is a type of cooperative, often with women, and therefore sometimes called women groups. The group saves money together, often a small amount every day or week. Members in the group can then borrow the savings for specific purposes. The other members encourage and control that the money goes to the decided purpose, for example clothes to the children or investment in a small-scale business.

Interventions

[NGOs]

Microfinance – Jamii Bora

Jamii Bora is a microfinance bank where poor people receive loans with no security, except that they have saved money before. The loans people receive go to small-scale businesses, houses, school tuitions and drilling wells (Jamii Bora).

Jamii Bora was founded in Nairobi in 1999 by 50 women on the initiative of Ingrid Monro, and has today grown to one of the largest microfinance institutions in Kenya. The philosophy is to provide poor people with a "ladder" that they themselves have to climb to get out of poverty (Jamii Bora).

The organization also has other social programs that have been developed from experience with the members (the people taking loans) One example is a program for addiction, which many families have problems with, but there are also education programs. A life and health insurance is mandatory with every loan, and was established when many lenders failed to pay back their loans because of hospital fees (Jamii Bora).

[NGOs]

Information Technology

Internet and mobile phones have changed the life in informal settlements and rural areas in Kenya.

One of the inventions that changed communication is the Ushahidi platform. Ushahidi was initially developed to map reports of violence and peace in Kenya during the post-election violence. Today the service has 45 000 users in Kenya. The platform builds on reports submitted via mobile phones that are depicted on a web map. Ushahidi is an open source software (Ushahidi 2013).

The Ushahidi platform has been used in the Voice of Kibera website. This is a community media website in Kibera aiming to represent the citizen's voice through reports. It also shows other relevant news and information. The website was initiated by Map Kibera Trust (Voice of Kibera 2013).

Map Kibera created the first map of Kibera that was free and open to everyone through OpenStreetMap. Residents were recruited for the project and collected the information in the map (Map Kibera 2011).

[Companies]

M-Pesa

M-Pesa is a way of transferring money through a text message with a mobile phone (Graham 2010).

M-Pesa was introduced in Kenya 2007 and today approximately 50% of the population uses the service to send money. When M-Pesa was introduced, it was as a microfinance loan repayment system with a grant from the UK government. M-Pesa is owned by the mobile phone companies Vodafone and Safaricom (Graham 2010).

To use the service, the first step is to register with Safaricom at an M-Pesa outlet. Then the phone can be loaded with money that can be send by a text message to another phone. That person can then go to a M-Pesa outlet and collect the money. The service is used for sending money to distant relatives, to pay for shopping and by small and medium sized businesses (Graham 2010)

[NGOs]
[iA]
[CBOs]

Community cooker

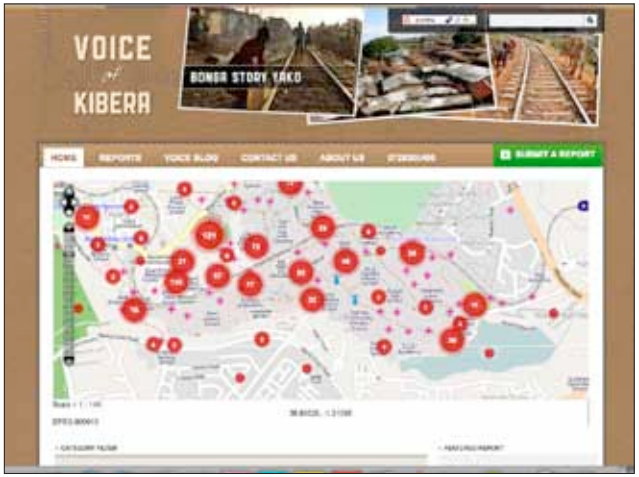
The community cooker can produce heat for cooking and boiling water from burned garbage. The cooker was developed by a Kenyan furnace builder and a Kenyan architect, financed by the United Nations Environmental Program (UNEP) and managed by a local NGO, Ushirika Wa Usafi Kibera (Esipisu 2012).

Garbage is collected and exchange for cooking time and hot water. 90 kilograms of solid waste is needed for one hour of cooking time, this takes about two hours to collect the waste. The NGO running the community cooker have seven youth employees that sort the solid waste (Esipisu 2012).

The cooker was developed as a prototype in the village Lini Saba, Kibera in 2008, and have been modified for the optimal design. The aim for the cooker was for it to be low-tech and labor intense, so it could create employment for the local residents (Esipisu 2012).

The cooker relieves pressure on the nearby forest that is otherwise used for cooking fire (Esipisu 2012).

Community cooker in Lini Saba
Source: Esipisu 2012, Planning System Services



The Voice of Kibera website

Internet cafe in Kibera

[NGOs]
[iA]
[CBOs]

BioCenters

Umande Trust and GOAL Ireland Partnership initiated BioCenters in Kenya. Umande Trust supports communities with knowledge and independent action (Umande Trust, GOAL Ireland Partnership 2009).

The BioCenter concept is a latrine block that converts sewage to biogas, which can then be used for cooking. The BioCenters also have showers and water kiosks. GOAL works with Umande to incorporate room for health workers. The centers do not require sewage infrastructure, and therefore suit informal settlements (Umande Trust, GOAL Ireland Partnership 2009).

Total Sanitation and Hygiene Access (TOSHA) BioCentre is one of the centers in Kibera. The centre was built by Umande Trust and GOAL in 2008 and is today managed by five local community groups. Each group, mostly women, manage the centre a week each. A toilet visit costs 2 ksh, a shower 10 ksh and gas for cooking one meal 10 ksh. The toilets can be used 600 times per day.

The toilet and showers are located on the ground floor, where the waste goes into the gas chamber under the house. There are special toilets free for children and a water kiosk selling. On the first floor are the cooking facilities, and on the top floor a community space that can be used as a cafe. This space is often let, for extra income.

Solar Water Disinfection (SODIS)

[NGOs]

The Solar Water Disinfection method, SODIS, is developed by Eawag that is part of the Swiss Federal Institute of Aquatic Sciences and Technology (SODIS 2012).

SODIS is a way of purifying water. Clear and clean plastic (PET) bottles are placed with contaminated water in the sun for 6 hours which eliminates the pathogens causing water borne diseases. Ultraviolet rays purify the water and a good place for the bottle is on the corrugated metal roofs (SODIS 2012).

SODIS has been implemented in Kenya since 2004 through Kenya Water for Health Organization (KWAHO). KWAHO has been responsible for the training (SODIS 2012).

Solar Water Disinfection (SODIS)

Total Sanitation and Hygiene Access (TOSHA) BioCentre

2.0

The Peepoo bag

[NGOs]

Peepoo is a biodegradable plastic bag that has an inside film of urea, which converts human faeces to fertilizer more rapidly. The bag can only be used once. After use the bag is stored for 2-4 weeks when the urea inactivates the harmful bacteria, viruses and parasites. The bag does not deteriorate until the faeces is completely sanitized and odor free since at least 24 hours (Peepoo 2012).

To support the bag when it is being used Peepoo has designed a portable seat, the Peepoo Kiti and for privacy a lightweight tent, the Peepoo Yizi (Peepoo 2012).

The Peepoo bag builds on the "flying toilet" concept, which is something that the residents in Kibera are ashamed of. Therefore the Peepoo bag should only be seen as a complement to other sanitation systems and not as a toilet.

The Peepoo bag
Source: Peepoo 2012

The Vacutug

[iA]

The Vacutug is a latrine pit exhauster made to operate in areas that are difficult to access and to replace manual emptying of latrines. The project was developed by UN-HABITAT (UN-HABITAT 2012).

The first step of the project was to test a prototype design, Vacutug Mark 1, which took place in Kibera between the year 1995 and 2000. After the trial, the Vacutug was modified and the financing possibilities were improved. The Vacutug can operate as a micro-enterprise by locals.

The second phase is to test the Vacutug in different countries, and the last phase is to scale up the production (UN-HABITAT 2012).

The Vacutug consists of a vacuum tank and a pump/tug. The tank has a volume of 500 liters and the tug comprises of a small petrol engine (UN-HABITAT 2012).

In Soweto East the operation has been taken over by Soweto Usafi group. The waste is discharged in nearby sewers (UN-HABITAT 2012).

The Vacutug Mark I
Source: UN-HABITAT

Street in Gatwekera

[iA]
[CBOs]

Sack Garden

The sack gardens are sponsored by an organization connected to the French government, Solidarités International, with the aim to secure food supply and the ability to produce food. It was implemented in 2007 (Solidarités International 2011).

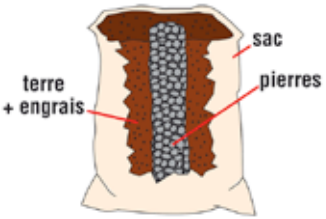
Growing vegetables in a sack requires little water, and small amount of land. The material is cheap and it diversifies the diet. The surplus produce can be sold at the markets, providing households with additional daily income (Solidarités International 2011). This makes them very popular and they can be seen everywhere in Kibera.

The first step in the implementation of the project is to recruit community organizers, who are the base of the project since they are responsible for training. Parcels of land are then selected and used to cultivate vegetables until they are mature. The plants are re-planted in sacks, where the vegetables continue to grow, and are harvested every 15 days. The vegetables that are grown are cabbage, spinach, tomatoes, onions and kale ("skuma-wiki"), which are typical household diets in East Africa (Solidarités International 2011). One sack of sukuma-wiki lasts 3 days for a family of 5 persons (Pascal 2010).

A nursery has been established in Makina village where people can collect seedlings and see a demonstration site in action (Pascal 2010).

1. Source: Pascal 2010

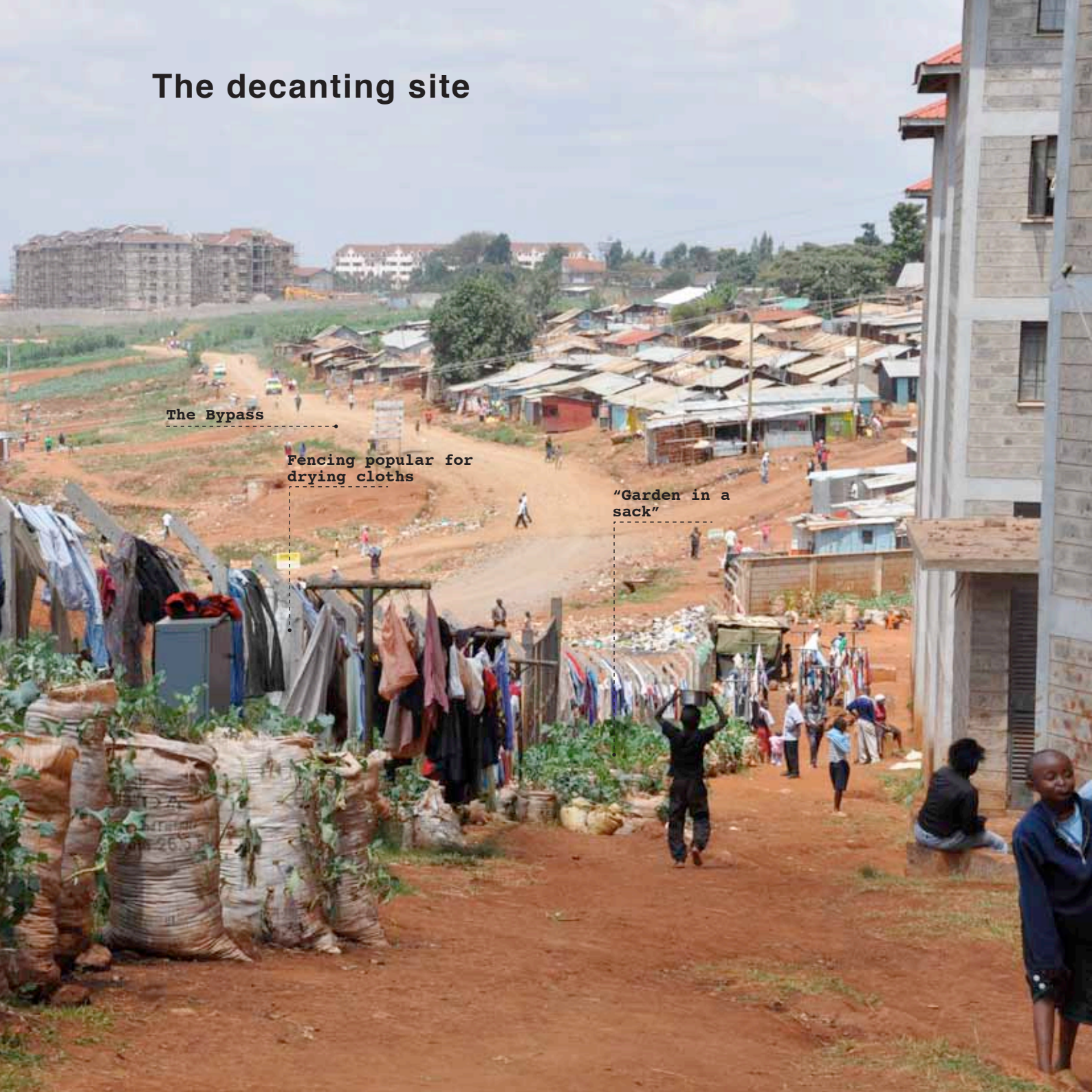
3.

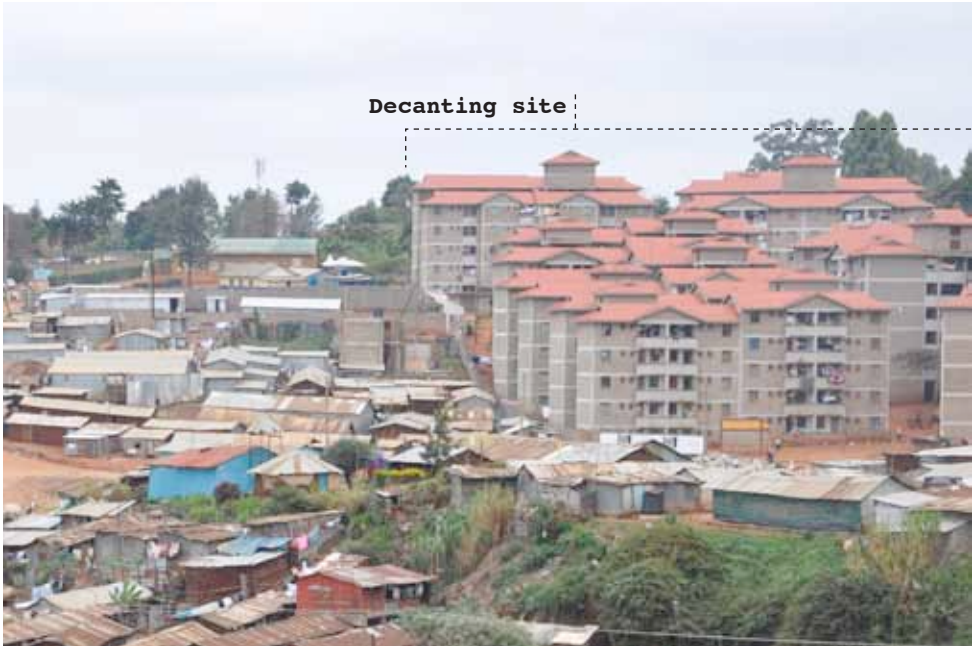


2. Source: Solidarités International 2011

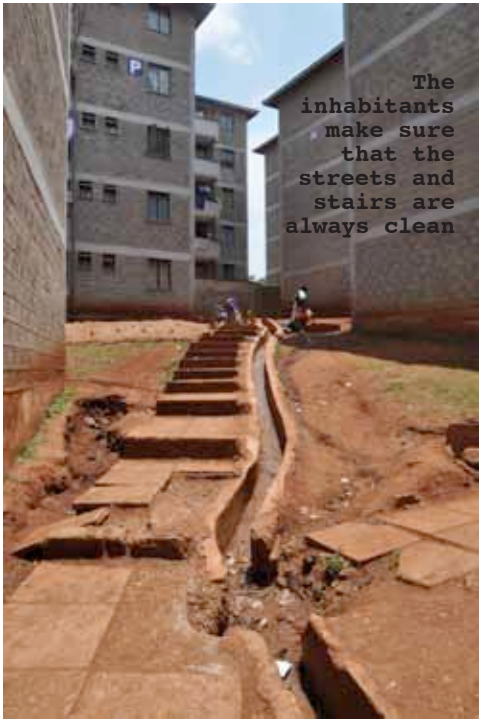
2.0

The decanting site





Businesses have begun to grow on the first floor in many of the buildings and between the houses, but the police harass them



[iA]
[Government]

Kenya Slum Upgrading Program (KENSUP) in Kibera

The Kenya Slum Upgrading Program (KENSUP) is a national program by the Kenyan governments, that began in 2002. The village Soweto East in Kibera is part of a KENSUP pilot program, where UN-HABITAT is facilitating the process and the Nairobi City Council is implementing the project. The key objectives of the project are improved basic services, secure tenure and opportunities to generate income (Mulcahy and Chu 2008).

One of the steps in the upgrading has been an enumeration by the residents, recording ownership, residential status and mapping the physical structures. This is a step before title regulations can be given, which is based on a consensus between the structural owners and tenants. The project has been delayed due to housing owners complaining, and there is a court case against the government. The landlords live off the income from renting and with the new plan this will not be possible.

The plan of the project has been to divide Soweto East in 4 zones. The zones are then upgraded one at a time. New houses are built on the same location where residents lived before. Residents from each zone live temporarily at the decanting site in Langata, the south-west corner of Kibera.

The first zone to be upgraded is Soweto East and residents have moved to the decanting site. New people have moved into the empty houses in zone A and they will be evicted when the new houses are constructed.

On the decanting site a room costs 1000 ksh, and there are different sizes of apartments, which have toilet, shower and kitchen. The houses are built in concrete and many inhabitants think the apartments are cold. People living on the decanting site go back to Kibera and Soweto East every day to work and many of the schools in Soweto East have closed, due to a decrease in pupils.

Businesses have begun to grow on the first floor in many of the buildings and between the houses, but the police harass them. This is a way for people to earn a living, with small-scale business, but this opportunity is taken away with the design of the houses. The possibility of keeping animals is limited, but along the side facing Kibera there is laundry drying on the fens and skuma-weki growing in bags.

A parallel project in Soweto East that is being implemented are improvements of the main road and sewage.

Soweto West and Gatwekera

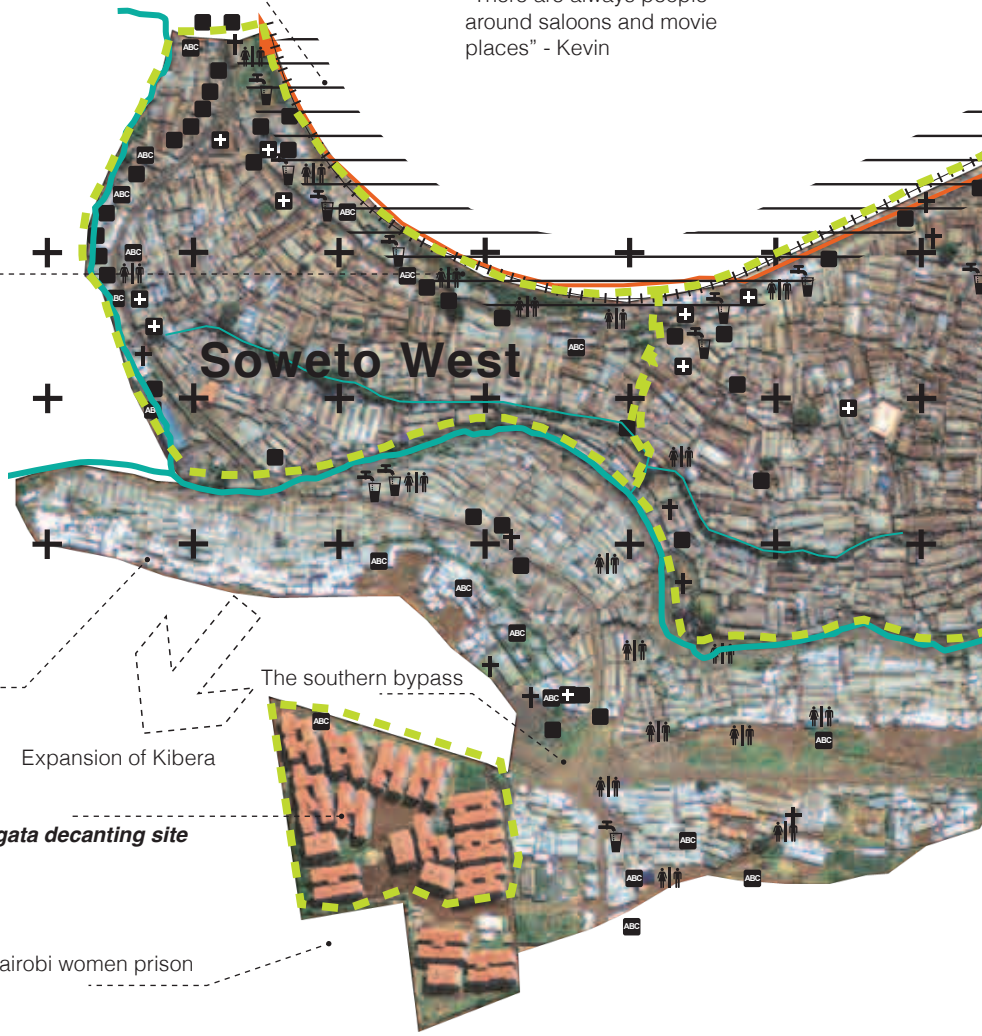
The railway is being used as one of the main roads

The railway reserve, 30 meters on each side of the railway line, is owned by the railway company. The buildings on the reserve can be demolished anytime. What will happen with the people living on the railway reserve is unclear.

Some parts of the road have more people socializing, depending on what business there is.

“There are always people around saloons and movie places” - Kevin

Water tank in Soweto West near the railway



2.0

Main street in Gatwekera

Sack Gardens
- urban farming

The road through Gatwekera is one of the most used roads in Kibera. The atmosphere is hectic.

The road is used as public place, children are playing, men play games, women are washing and cooking.

This road has sewage canals on both sides of the road, which is cleaned by the people occupying the surrounding buildings. Some parts are cleaner than others.

Vendors gather in streets which are people intense; the main roads. The rent is also higher at these locations.

Biogas centers

A village with fewer water and sanitation places indicates a “poorer” part of Kibera.
This is often related to being close to the river, which is contaminated and where there is a larger risk of floods.

Expansion of Kibera

Legend

- Villages
- Most used roads
- River
- Railway
- Railway reserve
- Grid, spacing 100 meters
- Water point
- Latrine
- School or Kindergarten
- Church
- Clinic or pharmacy

Source:
Interviews, discussions and the Map Kibera project (2010). The information serves as indicators and the information is not exact.

Soweto East

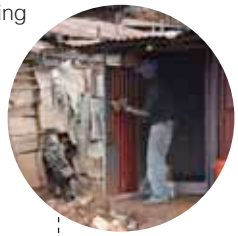
The Vacutug has been tested in Soweto East

Sack Gardens
- urban farming

Urban farming
Pigs usually live along the rivers

"I feel very safe walking around in the village with Fransic, people know who he is and they know what is about. This is one of the few places in Kenya where I feel like one in the crowd." Emma Engleson

The possibility of improving houses without long bureaucratic processes opens up for creativity



UN-HABITAT Resource Centre

Legend

- Villages
- Most used roads
- River
- Railway
- Railway reserve
- Grid, spacing 250 meters
- Water point
- Latrine
- School or Kindergarten
- Church
- Clinic or pharmacy

Source:
Interviews, discussions and the Map Kibera project (2010). The information serves as indicators and the information is not exact.

Agnes Ogana:
"-I remember when I was a child,
then we used to go to Nairobi dam on weekends and holidays to go on the small boats you could rent"

The south part of the dam is today being claimed by developers.

Nairobi Dam

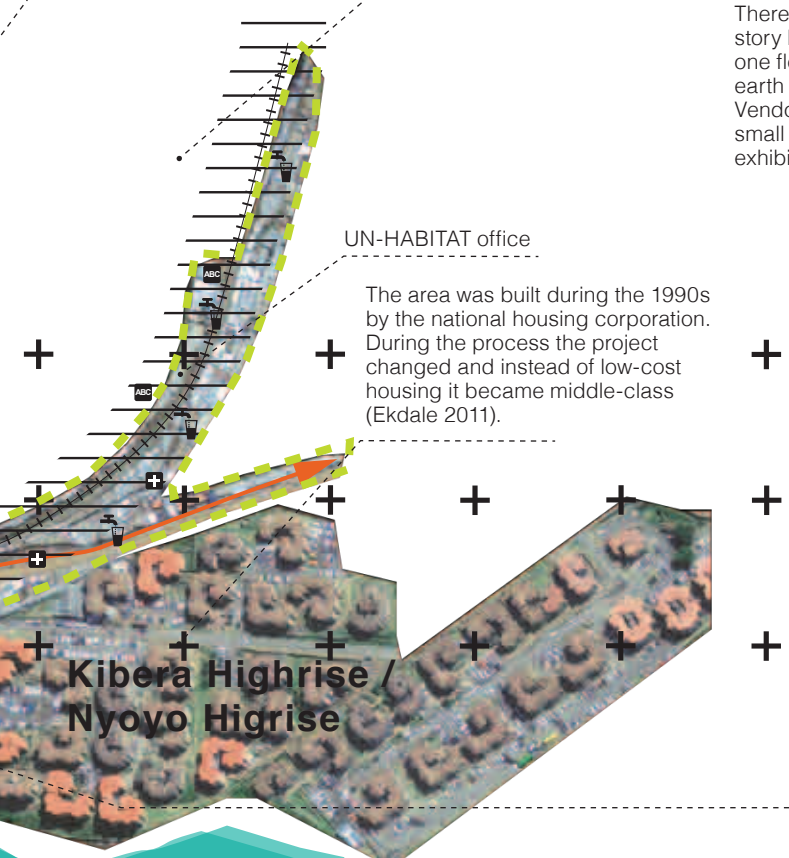
Roads under construction by local labour, but run by a construction company from outside. The improvements are part of the KENSUP road project.

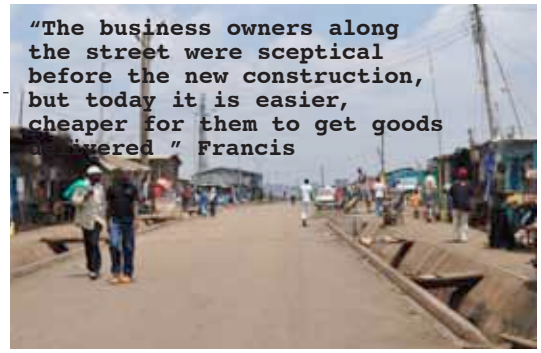
Empty houses (Jirongo housing estate), that today house Kenya Medical institute. There was talk about using it for the decanting site in the KENSUP project.

There are some two story houses, where one floor is built in earth and one in tin. Vendors use the small sidewalls to exhibit their ware.

UN-HABITAT office

The area was built during the 1990s by the national housing corporation. During the process the project changed and instead of low-cost housing it became middle-class (Ekdale 2011).





The dam was meant to supply Nairobi with water, but today the water is too contaminated to be used. Sewage water from Kibera and the surrounding neighborhoods end up here.

The dam is covered by water hyacinths that where planted with the intention to clean the water, but because the contamination is nutrition for the plants they breed and cover the whole dam.

On the south side of the dam Nairobi Yacht Club is situated.

Interventions to strengthen and trigger already existing social structures in Kibera

3.0
PROGRAM

This chapter illustrates examples of how some of the most pressing issues in informal settlements can be improved, and at the same time not jeopardizing the culture of the people living in the settlement.

Program

The “components” consist of a part, for example a material or animals. The “prototype” consists of several parts, for example a combination of “components” or other elements. Together components and prototypes form infrastructure that can improve the conditions in Kibera.

The components and prototype originate from different conditions based on traditions and culture, and enhance the existing qualities. Other components and prototypes are based on development projects by aid agencies that have been implemented in Kibera, and in other informal settlements in the world.

There is a need for a platform, both physically and on the web, where ideas for components and prototypes can be discussed and developed to be adapted to the residents needs. The platform can also operate as a collection of knowledge and best practice from other examples in the world, and for coordination of projects that are active in Kibera.

New

[P] Eco-toilet
Prototype

[C] Bamboo
Component

[P] Water Collection
Prototype

Based on Tradition and Culture

[C] Cooperatives
Component

[C] Animals
Component

[C] Sisal
Component

[C] Earth
Component

[P] Incremental housing
Prototype

Existing Projects

[C] Sodis
Component

[C] Internet
Component

[P] Cooker
Prototype

[P] Biogas
Prototype

[C] Plants
Component

[P] Vacutug
Prototype

[C] + [C] + [C] = [P]
Component Component Component Prototype

Component
“a constituent part; element; ingredient”

Prototype
“the original or model on which something is based or formed”

www.dictionary.reference.com

3.0

Program

Advocate for self-managment!

[C]
Component

Modifications and alteration to adapt to the contexts

[P]
Prototype

Existing situation

Implementation
[C] and [P] improve the problems

[Qualities]


Technology

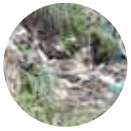

Materials and Techniques

Organizations and Entrepreneurship

Urban Agriculture

[Problems]


Food


Waste Management

Sanitation

Water

Kibera

3.0

Self-advocacy
Emphasizing traditions and culture strengthens the identity and gives courage to value the qualities in the community. For example, the tradition of cooperatives, women groups and entrepreneurship, gives development projects local management and finance possibility.

Facilitate opportunities for informal activates
Informal businesses are where most people in informal settlements work, and where they get their service and commodities. The informal economy is adapted to the living patterns in informal settlements.

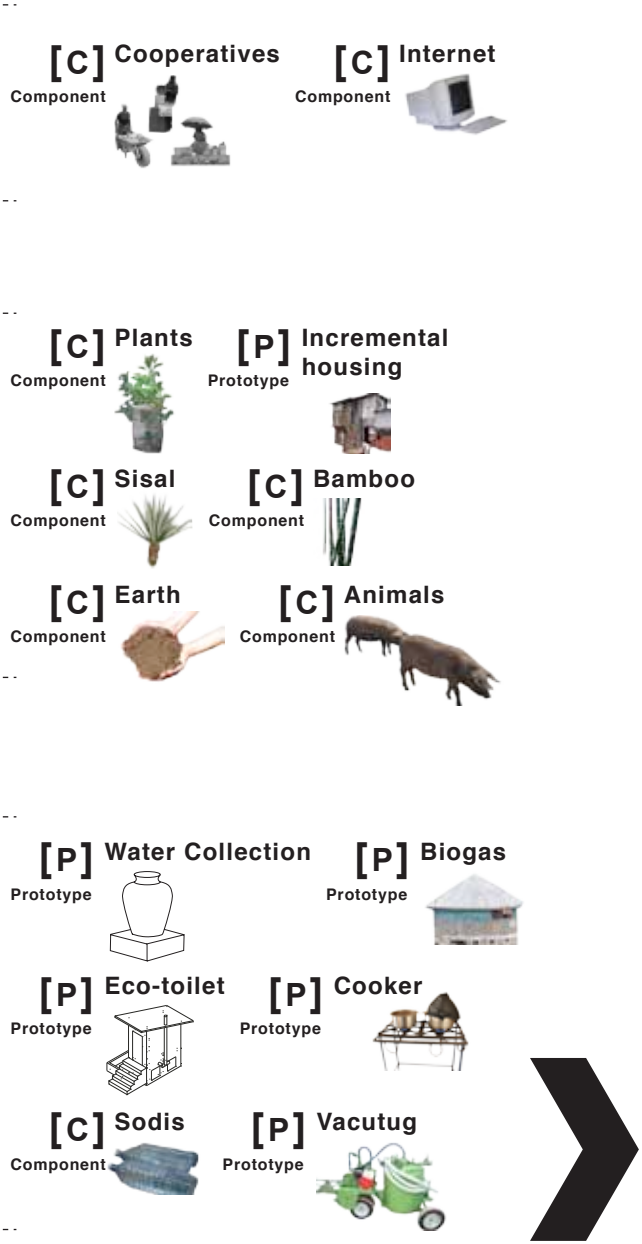
Small-scale businesses can be strengthened by forming cooperatives, which can have an influence on the market and the ability to compete with larger companies that sometimes exploit the community.

Learning from the existing conditions, history, traditions and culture
Learning from the existing conditions, history, traditions and culture are important parts of self-advocacy, but the use of traditional building techniques and materials also improves the buildings.

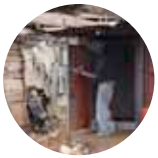
Traditional building materials are often in the country and therefore suited to the climate. Traditional techniques have been tested and developed over time and are sustainable both to the climate and the culture. With cultural and environmental change, some of the traditional materials and techniques have to develop. This needs to be done with respect for the culture.

Infrastructure - water and sanitation
Water and sanitation are the source of most problems in Kibera. Inadequate infrastructure results in poor health, leading to diseases and often death. Poor health and hunger decreases the working capacity of people. Water and sanitation are the most pressing physical infrastructure to improve.

The proposal of water and sanitation infrastructure is a system that is adapted to the environment and the spatial patterns of informal settlements and self-supporting.



Sustainability

	Strengths	*Why this should be strengthened*
COMMUNITY / *ECONOMY*	**Organizations and Entrepreneurship**    Vendors Marry -Go -Round Youth Group	[Community] The already existing network in Kibera of different organizations and groups could ***manage*** the process of projects and programs. [Economy] The structures of saving groups and entrepreneurship that exist, are a way of creating finance for projects with initiatives coming from the community. If a demand is filled by an ***affordable*** service or product, it will spread over the community and improve the situation, and create an ***income*** opportunity for the entrepreneurs supplying the service or product.
DESIGN	**Urban Agriculture**   Green Sack Gardens Animals	[Community] The local groups and organizations can manage the agriculture on a larger scale than the household on its own. [Ecology] Urban agriculture is good for environmental reasons when ***food*** does not have to be transported. [Economy] Growing vegetables and grazing livestock will contribute to the household's food supply, but can also be sold to the local community for ***income***.
	Materials and Techniques   Earth - Sisal Second story buildings	[Community] Traditional materials and techniques will help to improve the status of the ***cultural heritage***. It is important for the community to understand what they have, and at the same time improve their houses. [Ecology] The materials used are biodegradable. A traditionally built house can be left, and nature can break down all the materials. [Economy] The materials used are often less expensive than iron and cements. The techniques allow for ***self-building*** and houses that can be ***maintained.*** Many inhabitants in Kibera have the knowledge of traditional techniques because they have used them when they lived in the countryside.
	Technology  Mobile phones M-pesa Ushahidi Voice of Kibera	[Community] Internet can be used to share ***knowledge***, which would give the community status and the power to ***advocate***. Ideas and best-practices can be shared with other parts of the world. [Economy] Internet cafes and letting office space with reliable internet connection can operate as a business.

The project process

Water Infrastructure

Scenarios

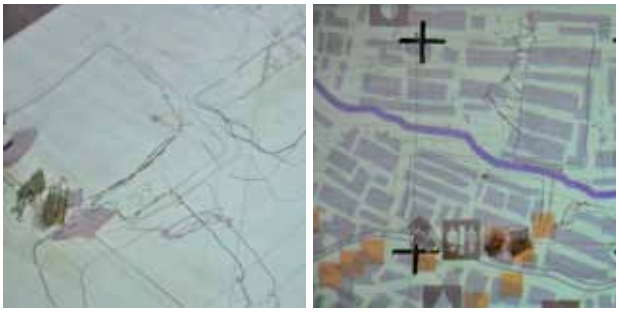
A workshop was done to elaborate physically and creatively on the effect of different implementations. The aim was to research what system would generate most opportunity for income, generating activities that would secure the livelihood of people.

The conclusion of the model workshop was that an infrastructure system for water is something that the community would gain most from. That would improve the health, but also open up for business opportunities for example restaurants, that would generate income.

Early idea models

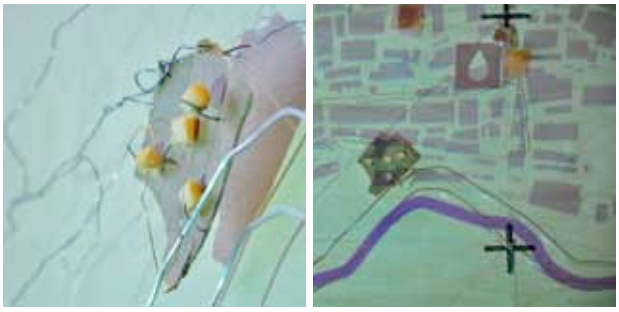
Vegetable production - strengthen already existing conditions and emphasizing ecology.

Small scale, around roads and larger scale in the railway reserve.



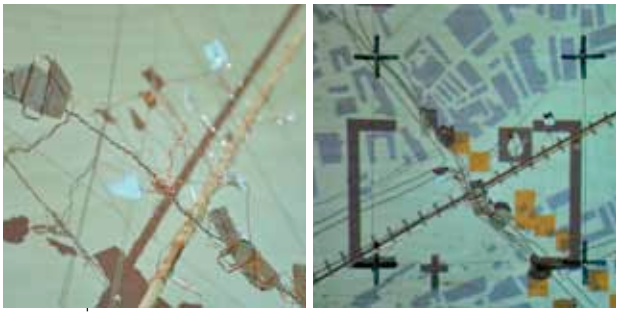
Urban farming - strengthen existing conditions and emphasizing ecology.

Land close to the river that is in the risk of floods could be used for animal grazing.



Road Material - improves the access to, and within, Kibera. Roads can also be used as infrastructure corridors.

The railway can be used for garbage collection, supplying the area with goods and transportation.



3.0

Objective: Improve informal settlements

Research: Informal settlements, the world and Kenya

Research on site

The research on site involved many visits to Kibera, photos, interviews and talk with both inhabitants and people working in Kibera.
Field visits through Nairobi were also conveyed to get an understanding for the city.

Program

After research in Kibera and living in Nairobi for six months, the idea for intervention was modified shifting from water transportation to a mix of interventions - a toolbox. A water transportation system in a conventional "western" way seemed difficult without destroying much of the existing structures in the settlements. The other scenario of urban farming and vegetable production was instead used as part of the mix of interventions.
The mix of interventions does not require connection to the main infrastructure systems of Nairobi city, and are in many ways more environmentally friendly than conventional systems.

Intervention for strengthen and trigger already existing social structures in Kibera.

[C] Component Plants

[C] Component Sisal

[C] Component Earth

[P] Prototype Incremental housing

[C] Component Bamboo

[C] Component Animals

Field research: Kibera and Nairobi

Conclusion: Program

Based on tradition, culture and existing projects

Urban Agriculture

Cultivation and livestock keeping

Urban cultivation is planting and gardening for food production in urban areas.

Small-scale food production in Kibera can provide food and reduce food costs. Eating vegetables will also improve nutrition levels, which is particularly important for people with HIV/Aids. The surplus vegetables can be sold and generate an income.

Most people in Kibera have moved from the countryside and have traditions of farming and keeping animals. They bring these habits into the urban context; this creates both opportunities and problems. In Kibera there are different animals, mostly pigs and hens. The Sack Garden is an already used form of urban cultivation.

The challenge is to modify the traditional way of keeping livestock, and cultivate into the urban context and the hygienic requirements that are then needed.

[C] Plants
Component

[C] Animals
Component

Benefits

- Secure food supply when high food prices
- Income generating
- Clean air
- Aesthetics

Challenges

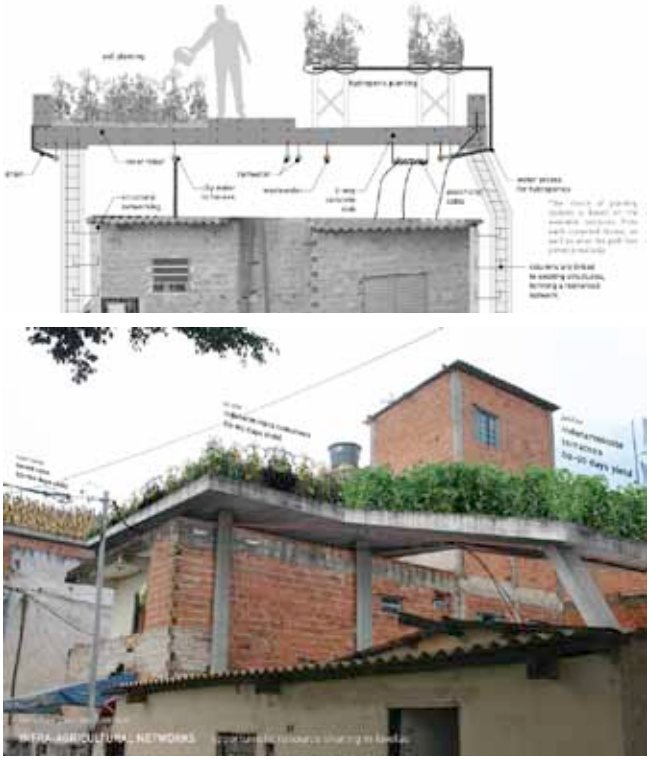
- Irrigation
- Fertilizer
- Hygienic requirements
- Theft

3.0

Case study

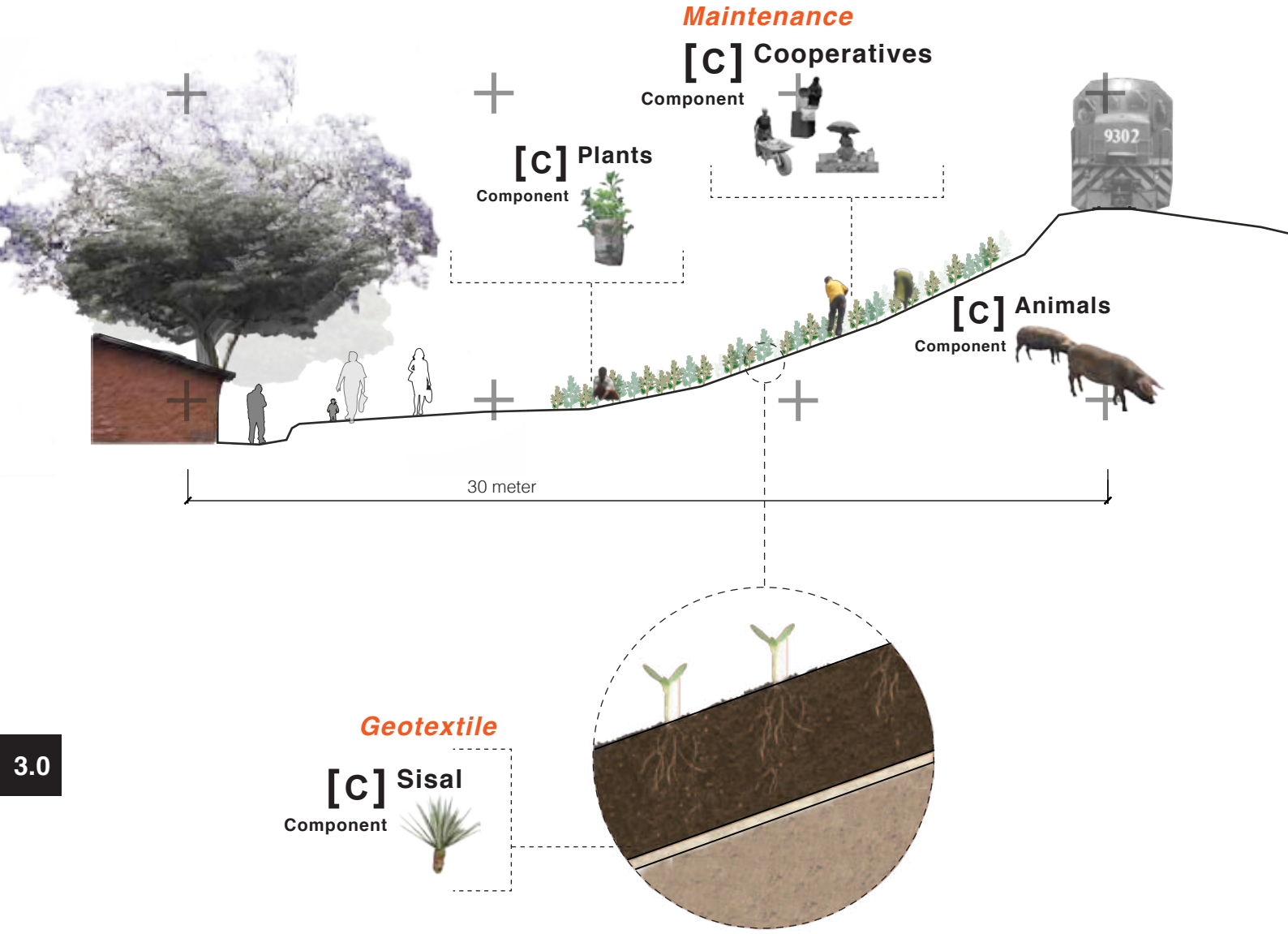
Urban Farming San Paulo

Urban farming is a research project by Zachary Aders in collaboration with U-TT in Paulo, Brazil, 2008. Concrete slabs are created on top of the existing houses. The network of slabs reinforces the houses and creates farming opportunities on top. The network is used to connect households with water and electricity. The goal of the project is in line with other U-TT projects which connect the informal with the formal city (Aders 2008).



Urban farming
Source: Aders 2008

Railway reserve as a space for plant nursery and animal grazing



Based on tradition and culture

Organizations and Entrepreneurship

[c] Cooperatives

Component

Definition

"A co-operative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise" ICA 2013

3.0


Top up here
Kabo
AMII

Cooperatives

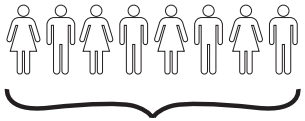
A cooperative is a business or organization owned and run by the members. The members can be customers, employees or residents. Cooperatives are often based on values of self-help, self-responsibility, democracy, equality, equity and solidarity. All members have anequal say in decisions and share the profit of the business (ICA 2013).

The International Cooperative Alliance (ICA) identifies seven principals for cooperatives:

- Voluntary and open membership
- Democratic member control
- Member economic participation
- Autonomy and independence
- Education, training and information
- Cooperation among cooperatives
- Concern for the community

Types of organization management

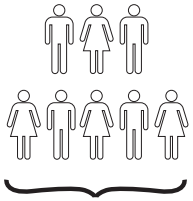
Direct control



Cooperative

Flat structure
The members take decisions together during regular meetings.

Indirect control



Cooperative

Hierarchy structure
The members elect a board that represents the cooperative and takes decisions.

Types of cooperatives

There are many different types of cooperatives and some are a combination of these. Main types are credit unions, housing cooperatives, and producer, worker and consumer cooperatives.

Credit unions and cooperative banking are financial institutions providing similar services as a bank. Members can save and borrow money at a low interest rate. The difference from a bank is that it is user-owned (National Credit Union Administration 2011).

Credit Unions are common in microfinance and development projects and similar to women's saving groups that are common in Kenya and Kibera.

Consumer cooperatives have the objective of providing quality service rather then monetary profit.

Producer Cooperatives are independent producers that share, for example, equipment and storage room. Production can come from farms, fishing, forestry, artist studios (CDI 2011).

Worker Cooperatives are owned by some or all of the workers. Examples of worker cooperatives are manufactures, construction companies and day care centers (CDI 2011).

Cooperatives in Kenya are an important part of the entrepreneurship, approximately 65% of the Kenyan population gain their livelihood from cooperatives (Coop Africa 2009).

Housing Cooperatives

Workers Cooperatives

Producer Cooperatives

Credit Unions $

"Local communities do not conserve water or maintain water system if the external agencies - bureaucratic or commercial- are the only beneficiaries of their efforts and resources" Shiva 2002

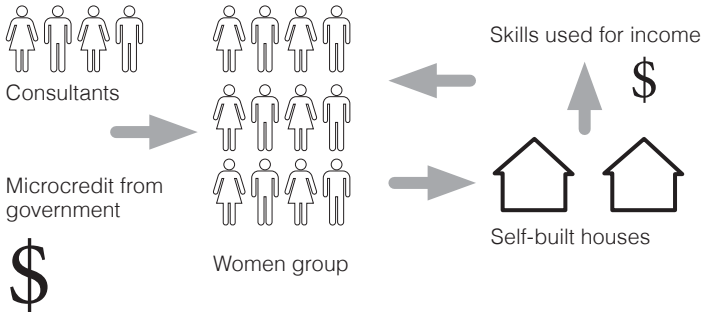
3.0

Case studies

El Programa de Vivienda Ecológica

The Programa de Vivienda Ecológica is located in Sonora, Mexico and began in 2000. It was initiated by a non-governmental organization, PROVAY and implemented through microcredit with technical assistance from Fundación de Apoyo Infantil Sonora (FAI) and Center for Sustainable Development at the School of Architecture at the University of Texas (Palleroni et al 2008).

Diagram of: The Programa de Vivienda Ecológica



Programa de Vivienda Ecológica is a self-helping program for low-income women, based on microcredit in a housing alliance where each member is able to contribute with their capacity and means. Before members in the credit-support group can receive a housing loan, they have to be active members for six months. After they have received a loan, they have to be members for five years. The groups consists of 20-25 women from the same community. The groups eventually become financially and socially self-regulated, but FAI remains as consultants (Palleroni et al 2008).

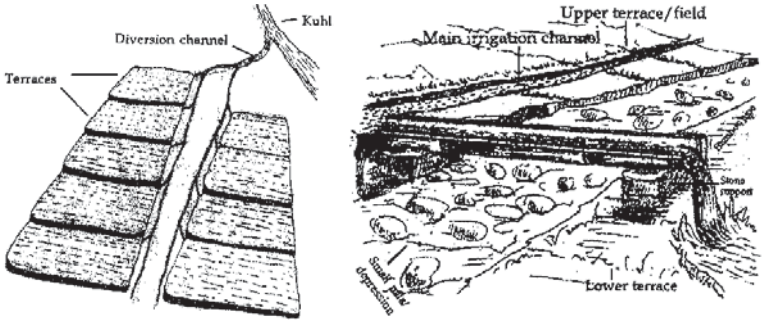
The knowledge the women get from building their own homes, by making adobe bricks, later becomes as an income source (Palleroni et al 2008).

Participation & Microcredit
Self-building

Traditional water systems management in the Himalayas

In India traditional water system was based on local construction and maintenance by the village or farmer associations that were widespread (Shiva 2002).

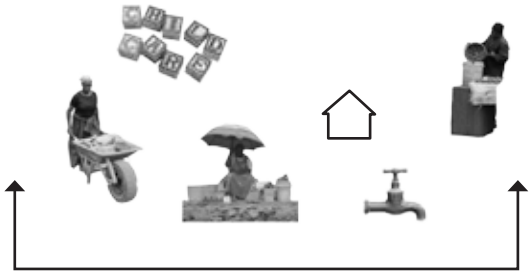
Kuhls is a type of small water channels used for irrigation in the Himalayas and have been used for about 3000 years. The Kuhls can be made of wood, bamboo or dug; the construction depends on the geological conditions (Verma1998).



Water Systems in India
Source: Verma1998

The systems are built and maintained by the village. One example of managing the irrigation system is on turn basis. If there are 20 families in a community, each has one day of watering, so they can water every 20;eth day. Then they can change with others members to share days, so they water half the day each. This makes it possible to water every 10th day (Verma1998).

During colonization self-managed water systems in India suffered. The British rule took control over the water resources. Bore wells and tube wells meant that the farmers had to have capital to access water. The government and external agencies eliminated the collective right to water (Shiva 2002).



Tradition and culture

[C] Internet

Component

Knowledge

[C] Cooperatives

Component

A cooperative with its principles is a way of preventing corruption, and all the involved actors benefit equally. A flat structure with direct control is preferred.

Cooperatives, especially amongst women, are a common type of saving money and maintaining different facilities in Kibera. The component based on cooperatives builds on existing structures and creates financial independence.

The component can be used in many different types of businesses, and in building and maintaining infrastructure in Kibera.

3.0

Based on tradition, culture and new materials

Materials and Techniques

[C] Earth Component

[C] Sisal Component

[C] Bamboo Component

3.0

[C] Earth

Component

Earth

Half of the world's buildings are built of earth or clay, either in its raw form or transformed. Transformation can be made with water, admixtures and compression (Vellinga et al 2007).

Soil is decomposed rocks that have eroded and weathered over time, and consist of gravel, sand, silt and clay. Different particle size and composition of the components determine the soil type, and if it is good for building. Water affects the plasticity and very dry soil is therefore unsuitable for building. The soils most suited for building are laterites and tropical red soil, these harden when they are exposes to the sun (Vellinga et al 2007).

The most common forms of earth constructions are fired and sun-dried bricks, rammed earth, wet earth and wattle and daub (Vellinga et al 2007).

Benefits

- More economic than manufactured material such as steel and concrete
- An ecological alternative
- Good indoor climate
- Local tradition, everyone knows how to build
- Maintainable

Challenges

- Low status of the material
- Vulnerable to erosion, water and seismic activity (Vellinga et al 2007)
- Integration in "modern" building practices and building codes (Vellinga et al 2007)
- Not all earth types are suitable for building (Vellinga et al 2007)
- It is needed for agriculture and pasture (Vellinga et al 2007)
- The availability in Kibera is decreasing

Lou house in Kisumu, Kenya
Source: Forsberg et al 2009

Meti - Handmade school
Source: Basehabitat 2013

[Sd] ***Sun-dried Brick (Adobe)***

Sun-dried brick is also known adobe, is made of a wet mixture of earth and straw. The mixture is shaped and dried in the sun. The shape can be formed by hand or in a wooden mould. The technique is commonly used in combination with other earth constructions such as rammed or with stone (Vellinga et al 2007).

A sun-dried brick is the most common type of earth construction in the world and is used in hot and dry climates, especially the Middle East, but also in the southwest United States and North Africa (Vellinga et al 2007).

[W] ***Wet Earth (Cob and Swish)***

A wet mixture of earth, fibre and water is laid on courses, which is dried before the next courses are laid on top. Variations of this technique are found in West Africa. It is there referred to as Swish. In Europe and United States the technique is referred to as Cob. The variation of the technique is composition of the soil, where small stones, gravel, sand and silt are sometimes added (Vellinga et al 2007).

[R] ***Rammed Earth***

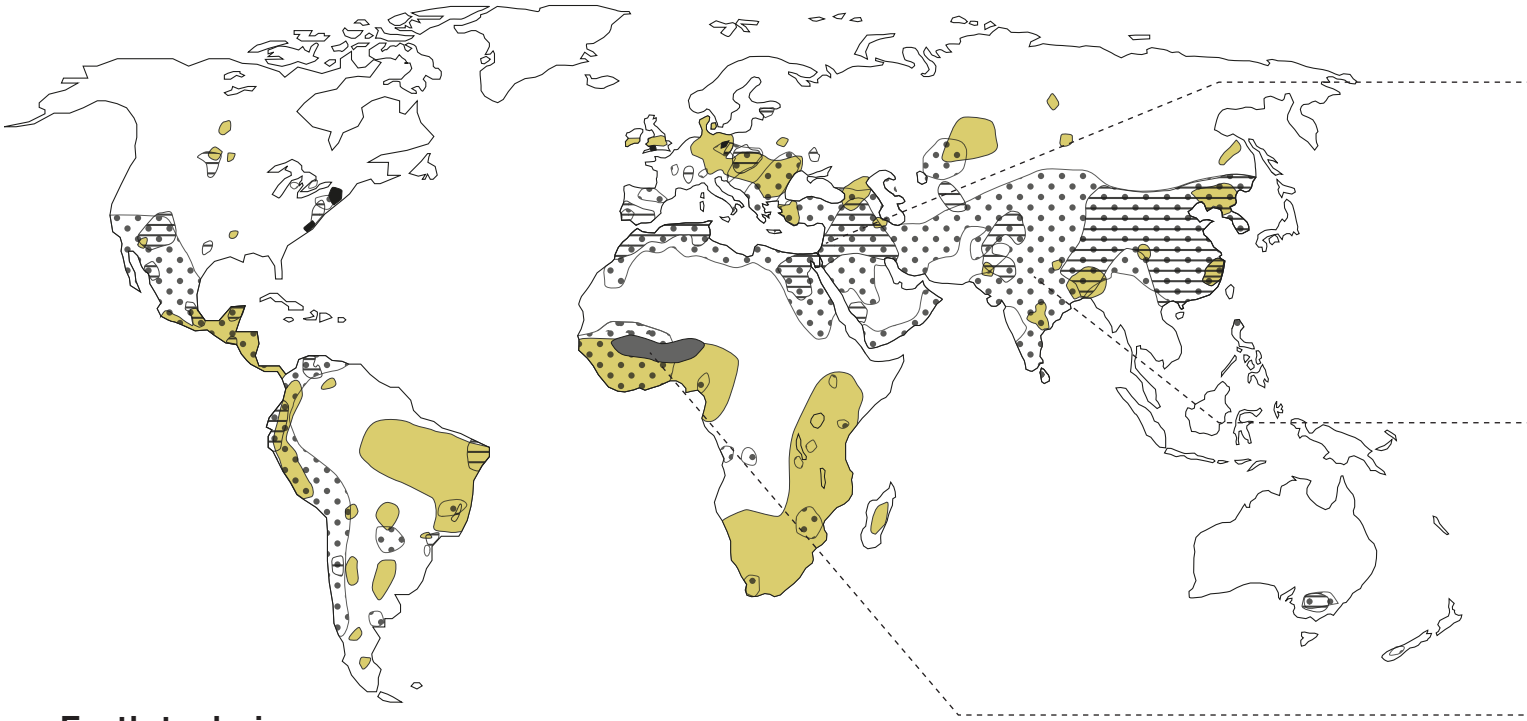
Earth is rammed or tamped in a wooden framework until it is compact. The earth is often mixed with straw, which is bonded with seed oil or lime. The technique is today used in the Middle East, North Africa, Southwest Asia, Europe and America (Vellinga et al 2007).

[Wd] ***Wattle and Daub***

Earth is plastered in to a construction with vertical poles and horizontal wattles. The frame is filled with an earth mix and then covered with layers of smearing (Forsberg et al 2009). The wattle construction can be of timber, bamboo or branches (Vellinga et al 2007).

The technique is one of the most used earth constructions in the world, and common in Africa and Latin America. It was until recently also used in central and northwest Europe (Vellinga et al 2007).

Wattle and Daub is traditionally used in Kenya and different tribes have developed different housing designs through the technique. Grégoire Pacoud at Craterre, one of the leading research centers on earth architecture in the world (through Malena Gyllenhak) believes that where the wattle and daub technique traditionally is used where the soil is too fat for rammed earth techniques.



Earth techniques

Source: modified from Vellinga et al 2007

Sun-dried Brick [Sd]

Rammed earth [R]

Wattle and Daub [Wd]

Swish [W]

Cob [W]

Case studies

Medwed Clinic

The Medwed Clinic is located in Wadi-Naam, Israel and was designed by Michal Vital and Yuval Amir. The clinic was built in 2003 (Architecture for Humanity 2006).

The group behind the project is Bustan, a collaboration of Jewish and Arabic eco-builders, architects, academics and farmers. The clinic is an unauthorized building and can be bulldozed without any notice (Architecture for Humanity 2006).

The building is self-sufficient, and was built with unskilled volunteers. The house is built of a straw and adobe construction, this technique has a long history with the local community, the Bedouins. The exterior walls consist of straw bales covered with earth. One wall is made of polycarbonate sheets with vegetation in between. An adobe brick wall separates the interior, with one room for dry area and one for wet. The house has natural ventilation, and a refrigerator run by solar power. The roof also collects rainwater to irrigate the fruit trees and herb garden (Architecture for Humanity 2006).

METI - Handmade School

Anna Heringer initiated the "School Handmade" in Rudrapur, Bangladesh, in 2005, as a Diploma thesis (Basehabitat 2013).

The goal of the project was to link the inhabitants of the village, school pupils and teachers, and to use and develop traditional materials and techniques. Clay and bamboo were used, which are inexpensive local materials, the builders were from the community (Basehabitat 2013).

Gando Primary School

The School was designed by Diébédo Francis Kéré in 1999, Gando, Burkina Faso (Kéré 2013).

The aim with the design was to achieve climatic comfort with a raised roof that shaded the façades and created a cool airflow. The walls are load-bearing and made of stabilized and compressed earth blocks, which absorb heat and moderate the room temperature (Kéré 2013).

Most materials and techniques were local and traditional to the village, but developed with new technology. People from the village learned to use a handsaw and a small welding machine and that was the only machinery used in the building process. The community was also involved in the design process (Kéré 2013).

Medwed Clinic
Source: www.openarchitecturenetwork.org 2010

Meti - Handmade School
Source: Basehabitat 2013

Gando Primary School
Source: Kéré 2013

[c] Sisal

Component

Sisal

Sisal (Agave sisalana) is a plant that yields stiff and one of the strongest natural fibers in the world.

The Sisal fibers are used in twine and rope for agriculture, but also carpets, matting, sacks, bags, geotextiles and more. Because sisal is a natural fiber and a renewable resource the potential of the material is high and the interest for it is growing (FAO 2001).

Sisal is used in the traditional Lou and Massai houses in Kenya as a rope to connect wooden poles and branches. Sisal used for ropes must be socked in water for 2-6 hours before becoming soft and flexible to bend (Forsberg et al 2009).

The plant has a life span of 7-10 years and produces 200-250 leaves for commercial use. Each leaf consists of 1000 fibers and the leaf can be harvested when the plant is 2-3 years, and then regularly every 6-12 months. Only 4% of the plants weight consists of fibers (Wigglesworth Fibers 2010).

Sisal grows in tropical regions in Africa, South- and Central America and Asia (FAO 2001).

In East Africa sisal is grown on estates and transported to central decortication plants for extraction of the fiber. After extraction the fibers are dried, brushed and baled, either for export or to the domestic mill. In Brazil the fibers are extracted by portable raspadors (Wigglesworth Fibers 2010).

The problem with the sisal production is that only the long fibers are used, they are about 2 % of the total plant. The rest of the plant is seen as waste and thrown away or burned, although research on using the material for energy, animal feed or organic soil improver has been done (FAO 2001).

East Africa has exported the material for a long time, but after the 1960s the production declined due to competition from synthetic fibers (FAO 2001).

Sisal used in a Lou house
Source: Forsberg et al 2009

Sisal rope
Source: Corona Comercio Industria 2011

Sisal is used as a natural geotextile
Source: FAO 2001

Benefits

- Strong natural fiber
- Varieties of use - high potential material
- Strong plant that can survive trough drought with very little nutrition (FAO 2001)
- Few diseases, no pesticides are needed in production (FAO 2001)
- Captures moist from the atmosphere and prevents soil erosion (FAO 2001)
- Can be planted and harvested any time of the year (FAO 2001)

Challenges

- Competition with synthetic fibers (FAO 2001)
- Most of the material is exported (FAO 2001)
- Sisal plantations replace native forests
- Pollution from fiber extraction process (FAO 2001)
- Waste products, but these can be used for bio-fuel as in some places in Tanzania (FAO 2001)

Sisal used as door cladding, seatback linings and package shelves
Source: Ford Motor Company

[c] Bamboo

Component

Bamboo

Bamboo is one of most used building material and one of the fastest growing plants in the world (Bambus - RWTH Aachen 2002).

Bamboo is a member of the grass family and a native plant to five continents, including Africa. It flourishes around the equatorial latitudes. Bamboo has been used in vernacular architecture in many cultures, mostly in Southeast Asia (Vellinga et al 2007).

Bamboo is known for its tensile strength and the high strength compared to its weight. The bamboo cane is dividend in several hollow segments, which are separated by nodes that reinforce the cane (Vellinga et al 2007). The tensile strength is higher than steel, but the problem is to construct connections that can transfer the tensile strength. The elasticity of the material makes it suitable in earthquake areas. Bamboo is also fire resistant; filled with water it can stand temperatures up to 400 Celsius, then the water inside the cane is boiling (Bambus - RWTH Aachen 2002).

After harvesting, the bamboo has to dry for 2-12 weeks depending on the species. When drying it shrinks more than wood (Bambus - RWTH Aachen 2002).

Arundinaria alpina is the native bamboo species to Kenya and the Rift Valley area. It grows on the mountains slopes on an altitude of 2400-3000 meters, but can also be found in mixed forests down to 1800 meters altitude. The stems become 2 to 19 meters high and 5 to 12,5 centimeters in diameter (FAO1998).

Due to Nairobi's high altitude the native bamboo species is likely to grow in the forest in and around the town. If this is not sufficient, it might be possible to use other species that have been introduced. But this has to be done with caution. It is difficult to predict the outcome of newly introduced species.

Bamboo is easy to harvest and can be worked with simple tools (Vellinga et al 2007).

3.0

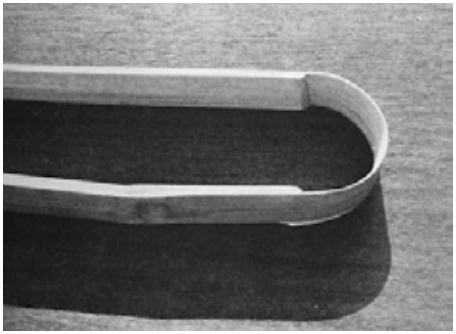
Bamboo used for scaffolding
Source: Bambus - RWTH Aachen 2002

Bamboo Primary School
Source: theskyisbeautiful

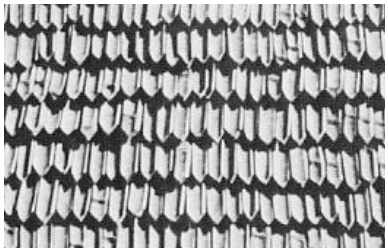
Case study

Bamboo Primary School
The school is located in Luong Son Village, Nha Trang in Vietnam. The building was finished in 2002 and designed by theskyisbeautiful architecture (Architecture for Humanity 2006).

The design in based on local traditions and the hot climate in central Vietnam. Bamboo is used in the roof construction. Most of the building is exterior space and between every classroom there is a garden (Architecture for Humanity 2006).



Freshly cut bamboo can be bent into desired shape and dried and it will keep the shape. It can also be heated to 150 C and then shaped.
Source: Bambus - RWTH Aachen 2002



Roof constructions
Source: Bambus - RWTH Aachen 2002

Benefits

- High tensile strength (Vellinga et al 2007)
- Fire resistant (Bambus - RWTH Aachen 2002)
- Low weight – easy to transport (Bambus - RWTH Aachen 2002)
- Easy to harvest (Vellinga et al 2007)
- Simple tools for construction (Vellinga et al 2007)

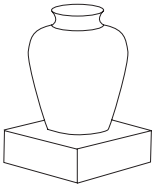
Challenges

- Connections that can transfer the tensile strength (Bambus - RWTH Aachen 2002)
- Replace native forest
- Problems with decay and termites (Architecture for Humanity 2006)

Water

[P] Water Collection

Prototype



To utilize water there are different steps: collection, transportation, storage and treatment. There are many different ways of supplying infrastructure for each of the steps. In cities water is supplied in large-scale infrastructure. Nairobi has a water shortage and the supply is unreliable. National effort needs to address this issue.

How to get clean and affordable water in Kibera is one of the main problems. The water bought at the water kiosk is expensive and, depending on how far you live from a kiosk, also heavy to carry. There is always a risk that the water is contaminated, one way of purifying the water is with the Solar Water Disinfection method, SODIS, that clean water through PET bottles that are exposed to the sun (for more information see the chapter on Kibera under interventions).

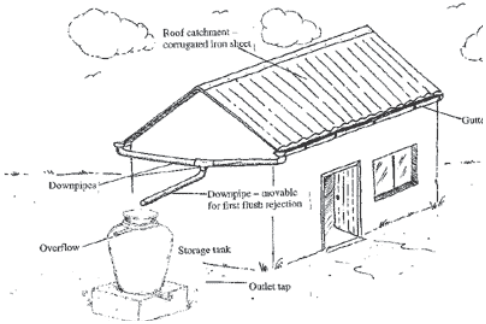
A self-made, home-based water system could complement the water kiosks, but the long-term plan should be to incorporate Kibera in the overall water infrastructure of Nairobi to secure supply and purification.

Case study

Very-low-cost Domestic Roofwater Harvesting

The Domestic Roofwater Harvesting (DRWH) Program at the University of Warwick did a feasibility study in Mbarara in south Uganda in 2000, to test a rainwater harvesting system. The system consisted of roof for harvesting and a storage tank. The possibility of roof water harvesting has increased with the more frequent use of hard roof materials such as corrugated iron sheets (Nyakaana et al 2000).

The storage tank materials that are commonly used are mortar jars, plastered bricks, oil drums, corrugated iron cylinders and plastic drums (Nyakaana et al 2000).



Very-low-cost Domestic Roofwater Harvesting
Source: Nyakaana et al 2000

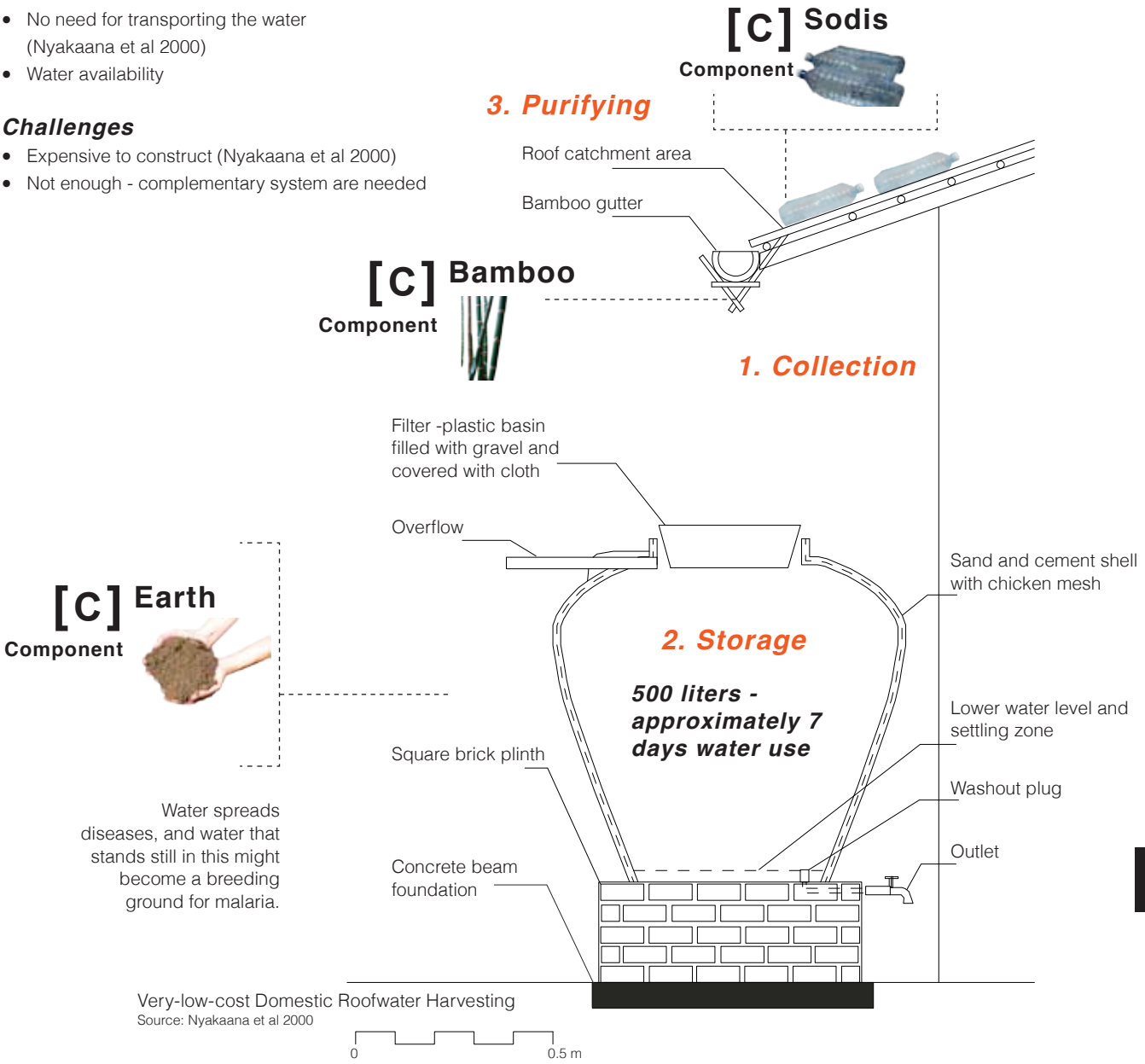
Self-made collection, storage and purifying

Benefits

- No need for transporting the water (Nyakaana et al 2000)
- Water availability

Challenges

- Expensive to construct (Nyakaana et al 2000)
- Not enough - complementary system are needed



Very-low-cost Domestic Roofwater Harvesting
Source: Nyakaana et al 2000

Sanitation

Inadequate sanitation, more exactly the human faeces, are responsible for many diseases spread in developing countries (Winblad et al 2004).

The most known sanitation systems in the developed world rely on large-scale infrastructure and abundant resources of water (flush-and-discharge). These systems are expensive and pollute large amounts of water (Winblad et al 2004).

The concept of ecological sanitation replicates nature by replacing the nutrients in human excrements to the soil. It uses the excrement as a resource rather than waste and develops systems not depending on water (Winblad et al 2004).

Ecological sanitation systems are an alternative to “flush-and-discharge” system, not only because they are cheaper and more environmentally friendly, but also because they can be adapted to the urban fabric in informal settlements. The challenge lies in securing ecological sanitation systems from failure because of poor maintenance and low status. These are the same problems as developed countries faces. They are also in a need of more developed sanitation systems.

In Kibera there is a need for more toilet facilities and the possibility of emptying them.

[P] Biogas

Prototype

[P] Cooker

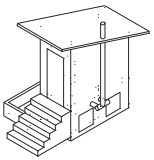
Prototype

[P] Vacutug

Prototype

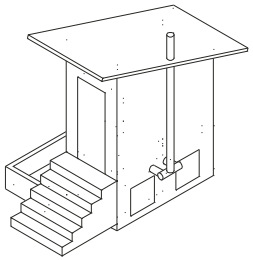
[P] Eco-toilet

Prototype



[P] Eco-toilet

Prototype



Benefits

- Affordable to construct
- Suitable for household toilets
- No need for pipe sewage
- Can treat animal waste
- Cheap fertilizer -recycling of nutrients
- Safe sanitation where water shortage

Challenges

- Need for training and knowledge to avoid smells and contamination
- Space to compost
- Emptying
- Operation of the facility

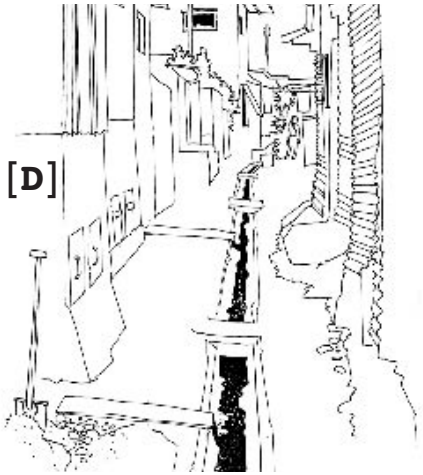
Eco-toilet / Dehydration toilet

Dehydration toilets are recommended in urban areas (Winblad et al 2004) and the concept suits Kibera, except for the areas that flood regularly. The most important part in a dehydration toilet is that the faeces dry (Winblad et al 2004).

The areas that gets flooded regularily are not suitable for housing, but can be used for other activities such as grazing animals and recreation.

The toilet separates faeces and urine. The urine is either taken to an evaporation bed with plants, or to a urine container where it can be collected and used as fertilizer (Winblad et al 2004).

Faeces are collected in one of the vaults. After defecation, an alkaline material such as ash or lime is added to keep the pH level high and to reduce moisture. When a vault is full it is closed and stored for 6-12 months. After this, the pathogens have decreased, which makes it possible to move the content for further treatment and elimination of pathogens. Secondary treatment can be high temperature and solar radiation. The complete process takes about a year, depending on the temperature and pH level. After treatment the humus can be used as fertilizer (Winblad et al 2004).



[D]

Double-vault dehydrating Eco-toilets in El Salvador, Mexico
Source: Winblad et al 2004

Faeces
Faeces contain most of the pathogens in human waste. The challenge is to eliminate the pathogens in a safe way and prevent them from from entering the body through hands, flies, water, soil and food (Winblad et al 2004).

Urine
Urine contains fewer disease-producing organisms than human faeces. After one month of storage it can be used in agriculture, but for small scale gardening it can be used straight away, mixed with water. The urine is watered on the soil, not on the plant, and it should not be closer than a month before harvesting (Winblad et al 2004).

Primary processing – reducing pathogens
The purpose of the primary processing is to reduce the volume and weight of faeces to facilitate storage, transport and further treatment. This is done in a chamber underneath the toilet. The pathogens are reduced by storage time (6-12 months), decomposition or dehydration and increased pH (Winblad et al 2004).

Examples of treatment types to eliminate pathogens are (Winblad et al 2004):

- Temperatures: Most microorganisms survive well at low temperatures (below 5°C) and die rapidly at high temperatures (above 40° C).
- Ammonia: Highly alkaline conditions will inactivate microorganisms. At pH 12 the process is fast. To increase the pH in faeces ash, lime and/or urea can be added.
- Dryness: Moist soil favors the survival of microorganisms. Dehydration of faeces in a processing chamber will decrease the number of pathogens.
- Solar Radiation: Ultra violet radiation from the sun kills the pathogens.

Secondary processing - eliminating pathogens
The secondary process aims at making the waste safe to return to the soil and eliminating the pathogens. This process takes place on-site or on a treatment station. The most effective treatment is by carbonization or incineration. Otherwise the treatment types are the same as in the primary process (Winblad et al 2004).

In countries with an ambient temperatures on 35 °C the process takes approximately 1 year, but it can go faster if alkaline materials is added and with a higher temperature (Winblad et al 2004).

Dehydration toilet [D]
In a dehydrating system the urine is separated from the faeces to keep the content as dry as possible. The urine is collected and can be used as fertilizer (Winblad et al 2004).

The faeces are dropped into a chamber where ash, lime or urea is added after defecation. This increases the pH level and lower the moisture, which reduce the pathogens. The chamber is then closed and stored for 6-12 months. After this the faeces are moved for second treatment to eliminate the pathogens. (Winblad et al 2004).

A household of 5-6 persons produces approximately 0.5 cubic meter of dehydrated faeces per year (Winblad et al 2004).

Decomposition toilet [C]
Composting toilets collects faeces and sometimes urine, but also household and garden waste. Bulk material such as straw, peat moss, wood shavings and twigs are added. After 6-8 months the partly decomposed material can be moved for second treatment in high temperature composting (Winblad et al 2004).

VIP latrine in Shey, Ladakh, India
Source: Architecture for Humanity 2006

Core Sustainable Unit / Dry Toilet
Source: Urban-Think Thank 2003

Case studies

VIP (Ventilated Improved Pit) latrine
A Ventilated Improved Pit (VIP) Latrine is a common way of improving already existing latrines. They are based on the same function as a normal latrine, with a pit that collects the urine and faeces. The liquid is infiltrated by the ground and the faeces degrades and can be used as fertilizer (Architecture for Humanity 2006).

VIP toilets have a vent that lets air flow through the space and through the latrine and out through a pipe. On its way out it carries flies and smell. The pipe is often covered with a dark finish to heat the pipe by the sun and increase the airflow (Architecture for Humanity 2006).

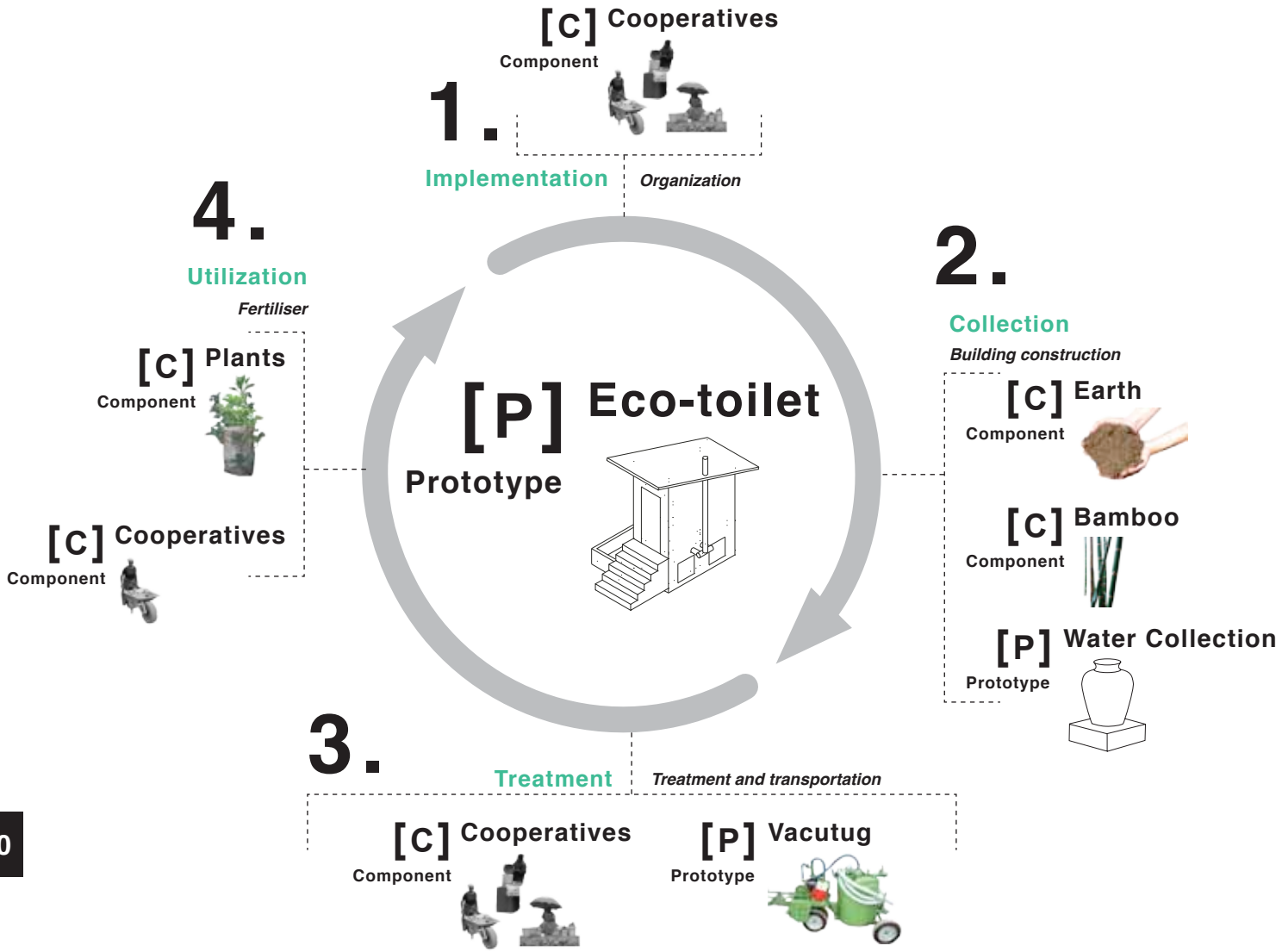
Arup Associates have designed a VIP Latrine for the Druk White Lotus School in Shey, Ladakh in India 2001. The toilet is built in granite because of the harsh climate, and with a wall facing south covered in a dark metal finish to heat the air and increase the airflow (Architecture for Humanity 2006).

Core sustainable unit / dry toilet
The dry toilet design by the Urban-Think Tank was first built in Caracas, Venezuela in 2003. The design was done in collaboration with the local artist residence program, and the client of the project was the La Vega Community / The Ministry of Environment of Venezuela (Urban-Think Thank 2003).

Important aspects determine type of toilet

- Climate
- Population density and settlement patterns
- Social/cultural
- Economic
- Technical capacity

Self-supporting system



3.0

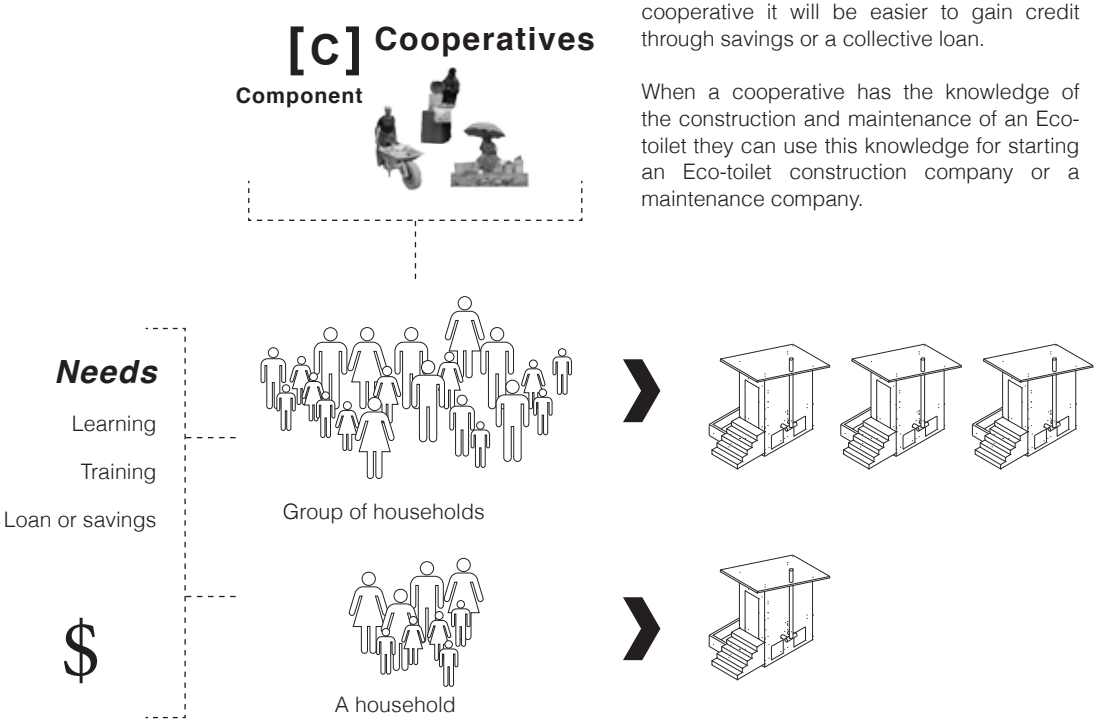
1.

Implementation

Organization

One household can implement the Eco-toilet, but if several households together create a cooperative it will be easier to gain credit through savings or a collective loan.

When a cooperative has the knowledge of the construction and maintenance of an Eco-toilet they can use this knowledge for starting an Eco-toilet construction company or a maintenance company.



3.0

2.
Collection

Eco-toilet
Source: Winblad et al 2004

Roof, that can be used for rainwater collection

Ventilation pipe, to prevent odor

Urine and water separation outlet

Two chambers, one is used at a time. The other is closed and allowed to decompose

Evaporation bed collects urine and washing water that are used as fertilizer for plants.

The evaporation bed can be planted with Bitter Gourd, Plantain or Cana indicus.

Opening for emptying the compost material

Water Harvesting on roof

[P] Water Collection
Prototype

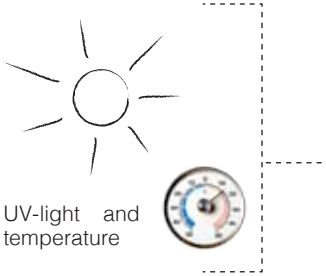
Material and techniques

To build the toilet other components can be used

[C] Earth
Component

[C] Bamboo
Component

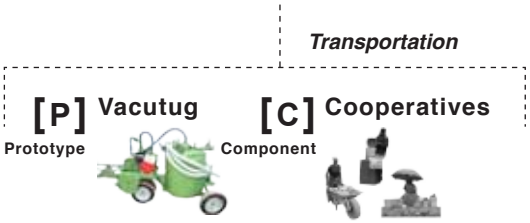
3.0



The first treatment is to reduce the pathogens and this takes place in the closed chamber for 6-12 months. The humus then has to be transported between the chambers on-site to an area for second treatment. The second treatment takes place on a designated area where the humus can become completely hygienic.

After treatment the humus is transported to the area where it is going to be utilized. In Kibera suitable areas for treatment are along the railway reserve where buildings are not permitted. This area is also suitable for agriculture, which makes the transportation between the treatment and utilization short.

Transportation and maintenance of the humus and urine creates business opportunities that can be operated by cooperatives. The Vacutug that is used today to empty latrine can be used for transportation.

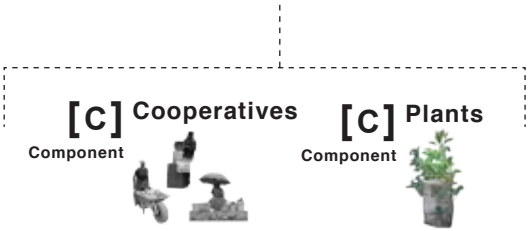


3. Treatment

Fertilizer

The fertilizer can be used in plant nurseries, which are needed before the plant can be planted in the garden sacks.

Suitable areas that could be used for common nurseries could be the area around the railway and rivers.



4. Utilization

Implementation of program

Land security is most important for the possibility of an informal settlement to be improved. Kibera needs to be recognized by the local government in Nairobi and tenants need to be taken seriously. Demolition is only an option if the land is unsuitable for housing, and then tenants should be relocated. Kibera and other informal settlements need to be included in the urban planning.

This program shows alternative infrastructure systems that are ecological and can be adapted to the culture and living patterns in Kibera, instead of demolishing and building new housing with western water and sanitation infrastructure.

To improve the living situation for the approximately one billion people around the world living in informal settlements, all stakeholders: inhabitants, international organizations, governments and companies need to work together for improvement.

Phase 1 - 1 year

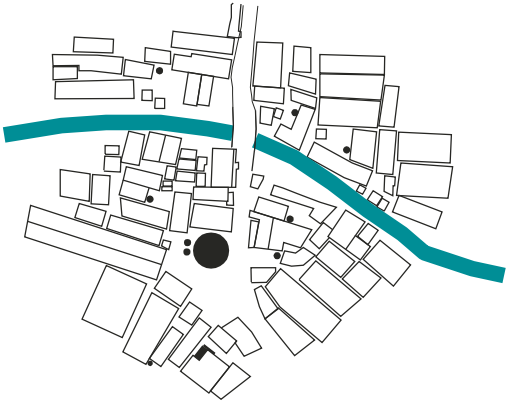
The first phase to implement the project is by, together with the community, gathering knowledge on infrastructure and organizing cooperatives. Through the cooperatives and organizations, funds and loans can be gained that can implement the infrastructure.

A platform on the internet and a physical location are needed for research, organization and testing prototypes and components. Community centers and websites as “the Voice of Kibera” can be used.

Phase 2 - 2 years

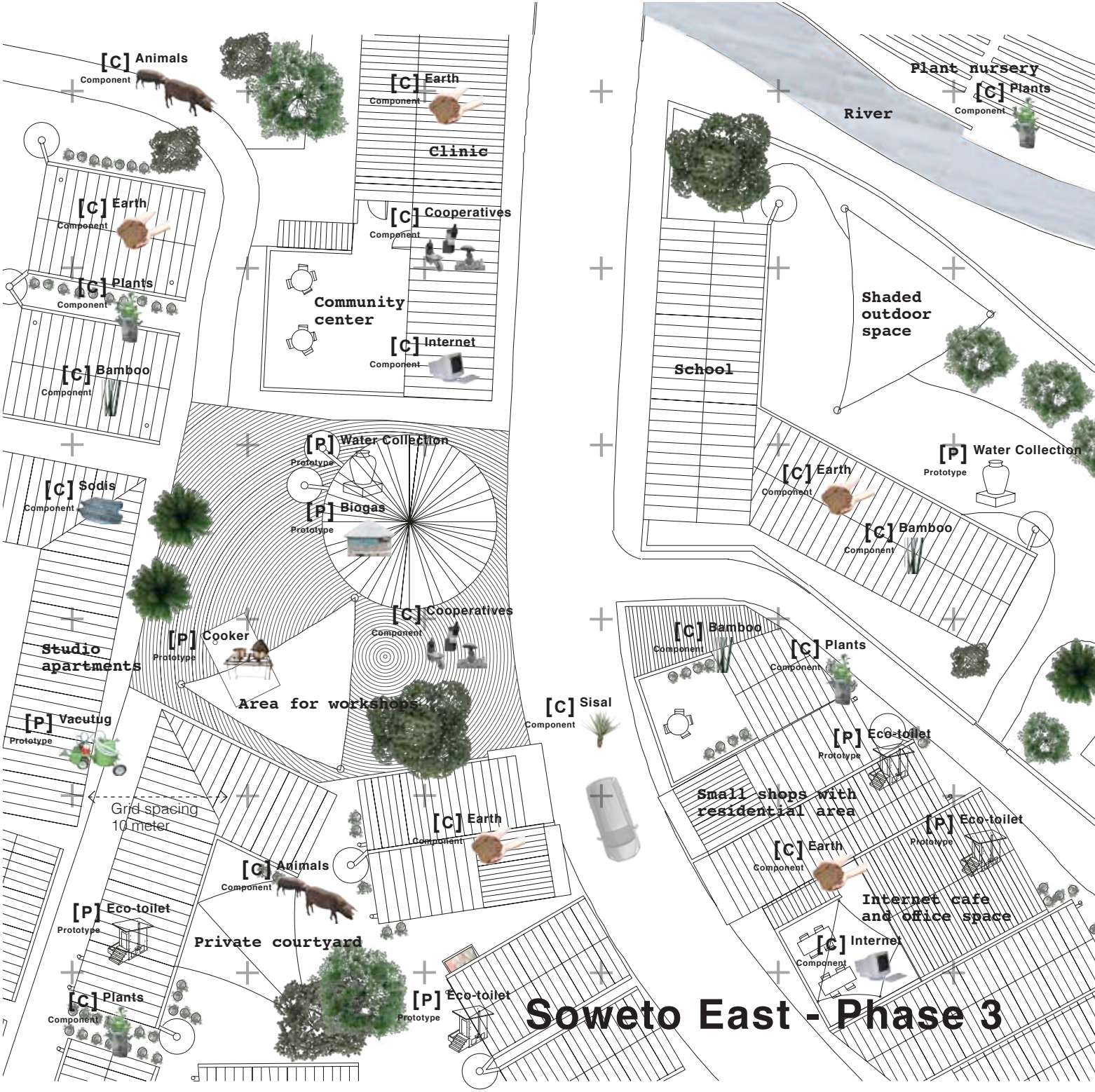
In phase 2, infrastructures have begun to develop in Kibera. The formal city council of Nairobi have recognized Kibera and are incorporating the settlement in urban plans, but still at a semi - formal way. If the infrastructure in Kibera would become formal this would mean that the price would rise, and the inhabitant would not be able to pay. That is why the transition has to be handle delicately.

Different types of infrastructures have been modified and are now successfully spreading though Kibera. The inhabitants have developed skill that can be used for starting businesses or getting a stable job. The inhabitants have begun to earn more money. Improved water and sanitation infrastructure have improved the residents health.



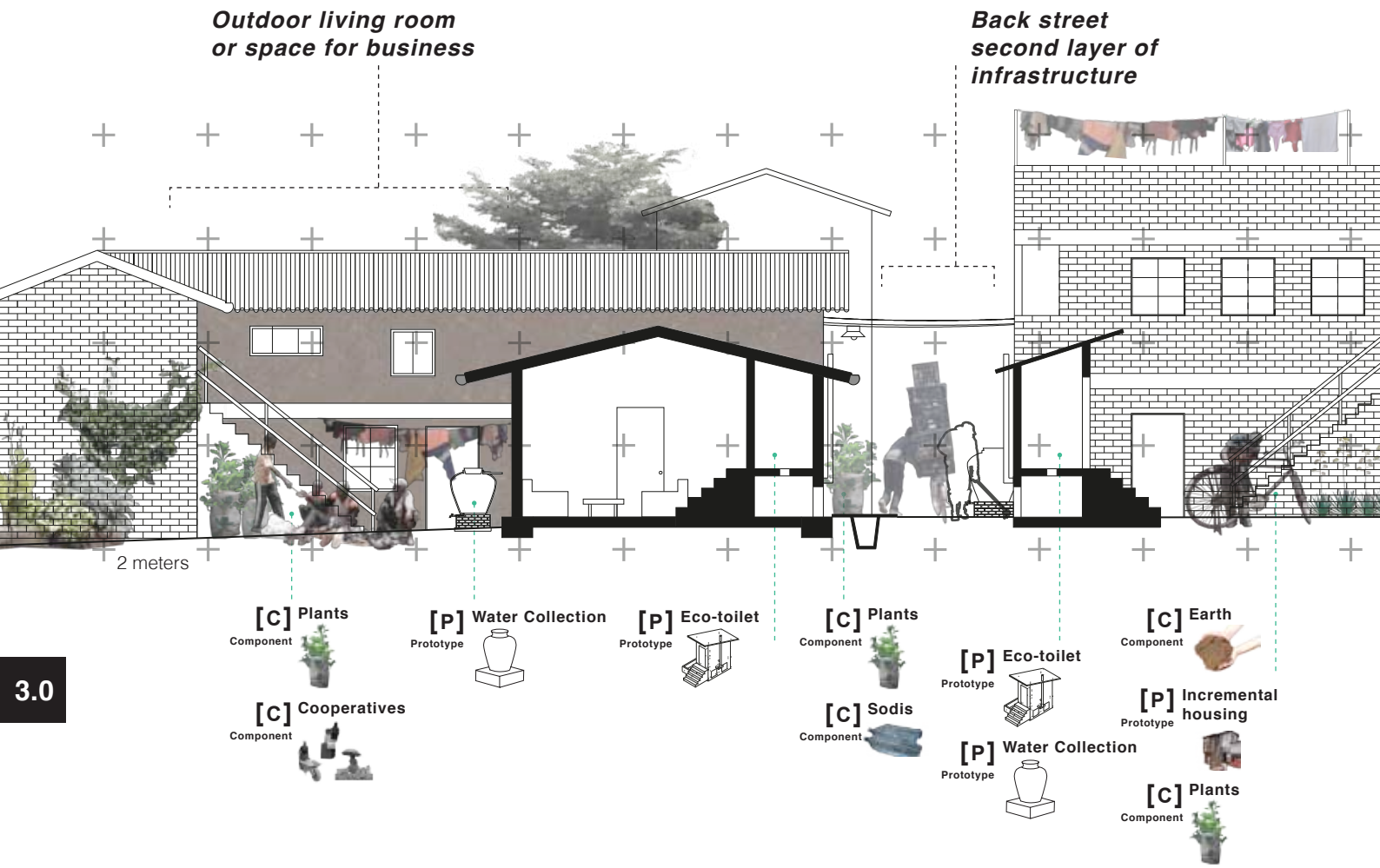
Phase 3 - 10 year

When the water and sanitation in Kibera is improved, together with secure tenure, Kibera will develop and the buildings can be improved. With a strengthened community, the housing is adapted to the local living patterns, keeping the characteristics of the culture and ways of life.



Soweto East - Phase 3

Soweto East - Phase 3



3.0

Human scale to building, keeping the connection to rural areas, and possibilities for farming

Improving the informal settlements of Kibera respect the local tradition and culture. Infrastructure is sustainable and adapted to a neighborhood scale.

Main street

[C] Internet
Component

[C] Cooperatives
Component

[C] Plants
Component

[C] Earth
Component

[C] Bamboo
Component

[C] Sisal
Component

[P] Water Collection
Prototype

[C] Plants
Component

[C] Animals
Component

3.0

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Good Fortune. Directed/Produced by Landon van Soest, Produced/Edited by Jeremy Levine: Transient Pictures

Caracas:The Informal City. By Rob Schröder with Alfredo Billembourgh and Hubert Klumpner: Submarinechannel

Final exhibition

A

Appendix

A

Summary of Interviews and Discussions

Francis Omondi Omboughr

Resident of Kibera, working for UN-HABITAT
22 of September 2010

The KENSUP Project
The first step was a Settlement Community Committee that formed an entry point to the community. The committee represents already existing organizations such as disabled, youth, women, widows and HIV groups. To find representatives ,an election was held. 17 members were elected; 2 from faith based organizations, 2 CBOs, 2 structure owners, 2 from disabled groups, 2 from youth groups, 1 NGO, 1 representing widows and orphanages, 5 from tenants (because 90 % of the population in Soweto East are tenants).

Soweto East was divided into zones where everyone was enumerated. Each zone is going to be moved to the decanting site when their new houses are constructed.
Zone A is the first area moved to the decanting site. The next zone to be developed is probably D or C, due to the geographical conditions.

The new houses that are built are going to be part of a cooperative (condominium). The total cost for membership in the cooperative is 420 Ksh, where 20 Ksh is registration and 400 Ksh is shares. The savings can be anywhere from 1-100 000 Ksh, depending on how big a unit you buy. The resident will get ownership of the flat. The cooperative makes it easier to get a loan from the bank. The idea is that when the loan is paid back, the cooperative can make investments.

Authority in Soweto East
There are many different authority structures; administrative, tribal / traditional, and the church. They all deal with domestic and criminal problems. The choice of structure is chosen by the involved part, but the church plays a big roll.

If you want to build a house, you identify where you want to build, and talk to the chief. No one is allowed to build anything in Soweto East now when it is in the KENSUP pilot project.

Youths
There are registered and non-registered youth groups. The groups in Soweto East are mostly involved in solid waste management. They are also involved in projects relating to bicycles, and making modules for cub stone used in road construction. Some youths are also trained as electricians, plumbers and steel fixers. The youth have created an umbrella organization.

Soweto Initiative Group for Action (SIGA) is a youth group with 60 members, 25 of which are women. They clean and organize workshops about HIV, drugs, and safe water. They also organize sports that bring youth together. There is not so much tribal issue amongst youth.

Women Groups
There are several women groups; probably 80% of the women are involved in a group. One group consists of 20-30 women; they use the groups for Marry-Go-Round. In a Marry-Go-Round each woman saves approximately 10 Ksh per week. The money from each saving opportunity is given to one person in the group. The group decides how the money is going to be spent, for example on clothes for the kids. Sometimes the group makes the purchase to be sure that the money goes to the right purpose.

The Skuma-weki or spinach growing in sacks around Kibera is organized like this.

Security
Francis believes Kibera is 10 time more safe then central Nairobi. "You rarely hear any gunshots, and if you do it is the police"

The community is facilitating the security, Kibera has "Community policing". The communities form networks and know if, for example, there is a new person in the neighborhood.

If someone is a "nuisance" (a person that has been in trouble, and is breaking the law again), and especially if a person is caught in the act doing something bad, people will stone them or burn them.

Good and Bad things about Kibera
It is close to the town center and the industrial area. The community cohesion and security is good.

There are problems with the physical conditions: water, sanitation, shelter and illegal tapping of electricity. Health is also a problem.

Others perception of Kibera
”Others believe that people in Kibera cannot think. They see people in Kibera as pigs; they think people in Kibera are like “Kibera”. They forget that there are a lot of talented people here with a lot of potential; talented professionals that can be of use for the good of the community.”

”If the youth are given an opportunity in music or acting they might not end up taking drugs. They are not being empowered, not given the opportunity. There is a lack of employment opportunities.”

Harrison Kwach

UN-HABITAT, Water and Sanitation
24 September 2010

The WatSan Project
The location of the toilet blocks provided by UN-HABITAT depended on what the community decided, and what land was available. That is why the toilet blocks are different in size. The communities arranged the relocation of people, if this was needed. The experience of community participation has been good.

During the construction process, the company that UN-HABITAT contracted used labour from the community. The community decided themselves who was going to work. The contractors only gave a list of how many skilled and unskilled people they needed and the communities organized the rest.

Kibera
“Like any other slum Kibera is a challenge, but the people in Kibera are empowered. They make demands for services from relevant authorities.”
People in Kibera are properly informed and can negotiate amongst themselves. This might be because there have been many NGO´s in Kibera.

“The disadvantage of this is that they are “over” empowered; they can even slow down the process. During the road construction they wanted certain qualities, but there was no budget for this. Of course this is good, people should know their rights. When donors come with politics or projects, like the pee-poo bag, that is not good for the community, it is actually contraceptive. An informed community knows when that is occurring and says no, this is what is happening in Kibera now.”

Douglas Namale

Editor and founder of Kibera Journal
7 September 2010

Douglas is the editor and founder of Kibera Journal and a “mapper” for the Map Kibera project. He has also developed a manual for information and communication technologies (ICT) for the government.

The KCODA center (Kibera Community Development Agenda) is an umbrella organization for the Kibera Journal (2006) and for Digital Village in Olympic Estate.

The Digital Village in Olympic Estate is the first Digital Village to be certified as a Pasha Center in Nairobi, but right now there is a problem with internet. “Pasha” infers to “inform” and the Pasha Center will have basic computer training.

Douglas developed a manual for Pasha Centers for the government, in collaboration with Kenyatta University. In the manual there are three different outlines for Pasha Centers; a low budget, a middle budget and a high budget. The idea is to begin with the low budget and then it can grow. Persons that have gone through training will be able to get loans from the government to open Pasha Centers. It is supposed to work as an income generation source.

What makes a Pasha Center different from other Cyber Cafes is that the government certifies the Center and allows the computers to access government sites. This is an initiative to make government assistance accessible to rural areas and informal settlements, and to ease the pressure on the government facilities.

Comment on Kibera
“The government allowed the slum to grow when they gave temporary occupants rights.”

“Congestion is a large problem, there is a need for the chef or local counsellors to make sure there is access to open grounds and toilets and bathrooms and open spaces where children in Kibera can play.”

"Some main sewage pipes from the surroundings goes through Kibera, and when there is a leakage no one comes and fixes it. The NCC (Nairobi City Council) is responsible for the sewage system."

"The new Constitution entitles everybody to a clean environment. If one strong case is taken to court, this might help to improve water and sanitation. This is where international organizations like the UN can help"

"Targeting skills development will create employment and work – one computer creates a business."

Comments on the KENSUP project
"The decanting site is good, but now there is a problem with schools in Soweto East when students moved to the decanting site."

"The labour needed for the construction of the road in Soweto East could have benefited more people."

"The meetings were small, and could have been big and public."

"Most residents in Soweto East are not members of the Cooperative. The cooperatives are often lead by structural owners and there is a need for transparency."

Kevin Otieno

Mapper at Map Kibera
7 September 2010

Kevin has lived in Kibera since 1986.

Kevin went to school in Olympic Private from when he was 3 to 10 years, and went to High School up country in the rural area. Now he goes to College and studies Community Development. Kevin has one younger sister and one older sister. The younger sister just finished high school and lives with his older sister. She just got a scholarship from Carolina for Kibera and will go to College. The older sister is married to a DO (District Officer) in Eldoret.

Kevin's mother was a nurse, but passed away in 2008. She started the Tabita clinic after she lost her job at Kenyatta hospital. The clinic was incorporated in Carolina for Kibera, an American help organization.

His rural home is outside Kisumu, in Nyankach. Kevin goes there for holiday once a year in December. Kevin is from the Luo tribe. In the rural home, the house is made of earth and the roof of iron sheets. His grandfather lives in their compound with his two wives. Most of his uncles live in Nairobi, and his aunts live with their husbands around the rural homestead.

In the future Kevin wants to finish College in Community Development. His dream job is with a big organization as the UN.

Administration
Kibera is divided into wards, each with a chief. The chief assists in solving conflicts, if there is a difficult conflict they involve the District Officer (DO) or the police. Above the DO is the District Commissioner (DC), their office is located on Kibera Dr.

"The chief is often corrupt, sometimes it is better to go to the DO, then he can direct you to the Chief, then he will probably do a better job."

Criminality
"The criminal people in Kibera tend to do their crimes elsewhere. When children do criminal things it is often to help their parents."

If a person is caught committing a crime and the police are late, people will stone or burn the criminal. Which way depends on the crime, but if you are caught in the act, you will die. Everyone is involved; men, women and children. This is taking place all over Nairobi; people speak in one voice when justice is being made.

Post Election violence
People stayed away for security reasons, the stayed up all night with machetes and other weapons. The people that got beaten were most Kikuyu. Raila is MP for Kibera, and many people are Lou, they felt that Kibaki had cheated and got angry with the Kikuyu when Kibaki won.

Non-Governmental organizations (NGOs)
NGOs have to contact the DO to let them know what they want to do in the community.

Often NGOs come and make money. They get donors and don't help the community. The NGOs that does help (like Carolina for Kibera) gives scholarships so people can go to school; university and primary.

Church
The church has a big influence, most of the population in Kibera goes to church. People listen to what the priest says.

Employment
Most people that work as "mjengo" go to where houses are being built and get paid at the end of the day. Others have businesses; many youths are matatu conductors and drivers. Most women do businesses selling vegetables.

Houses
When new people come to Kibera they first stay with friends and family, and afterwords they get their own house. The location depends on when you get a job.

In a good house you have your own toilet and bathroom and you don't need to share. Good neighborhoods are Olympic and Ayany Estates. Houses are modern –well built, with water, toilet, and kitchen inside (estates are well built houses).

The most expensive building materials are concrete and wood. Earth is cheapest, but it is getting more expensive because there is no earth left in Kibera to build with. Transportation to Kibera is expensive.

The rural houses are well built with earth, cow dung and thatched roof.

Good and Bad things with Kibera
"Most people went to school, but they don't have any jobs."

"Outsiders see Kibera as a bad place, but people that live in Kibera know it is a good place, for security reasons. People that have lived in Kibera for a long time feel secure, people help each other and they are united!"

"Actually the problem with Kibera is sewage, toilets and houses. And the high levels of HIV/AIDS, which leave many kids as orphans."

Roi Chiti

UN-HABITAT, Korogocho upgrading project
Korogocho is an informal settlement in the northeast of Nairobi, next to the main dumpsite in Nairobi, Dandora dumpsite.

The project is lead by the government with UN-HABITAT as advisors and has a "soft" approach.

The project began with a Socio-Economic survey that showed:
-90% of the land is government owned
-People have lived there for 60-70 years
-The population was much less than expected

The Program is a collaborative between different actors and with participation by the community. The project plans basic services such as roads, water and sanitation. The community decides where and what is needed. And if demolition is necessary they make the decision. The community had an election to form a steering committee. There is no shelter component, instead the focus in on secure tenure.

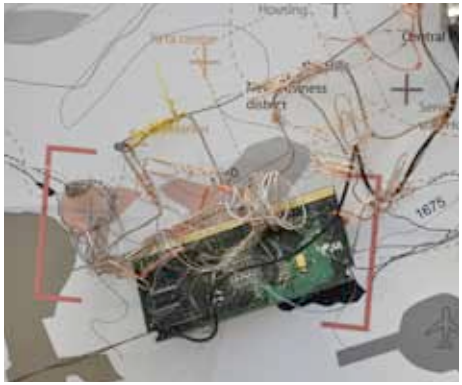
Developed / Developing countries

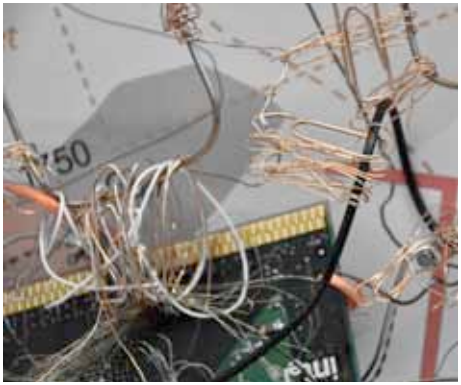
From UN-HABITAT 2003
More developed regions: All countries and areas of Europe and Northern America, as well as Australia, Japan and New Zealand.

Less developed regions: All countries and areas of Africa, Latin America, Asia (excluding Japan), and Oceania (excluding Australia and New Zealand).

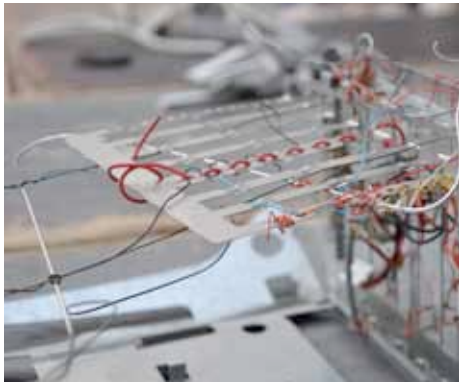
Least developed countries (LDCs): The United Nations currently designates 49 countries as LDCs: Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Togo, Tuvalu, Uganda, United Republic of Tanzania, Vanuatu, Yemen, Zambia.

Models from the project process





Understanding Kiberas connection to Nairobi



Early intervention model - street section with infrastructure elevated

Understanding Kiberas topography

A

Kibera is a very dense place and land is valuable. Using the roof as space on top of their roofs for cultivation, would open up for income generation and food supply

A net of the traditional material sisal could be used as an infrastructure on top of the roofs, where the sack be placed.

A

CHALMERS