

TOWARDS A SUSTAINABLE LAKEFRONT IN KISUMU

A proposal to Support Environmentally Friendly Livelihoods and Behaviour at Luangni Beach

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CHALMERS

Towards a Sustainable Lakefront in Kisumu - A Proposal to Support
Environmentally Friendly Livelihoods and Behaviour at Luangni Beach

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ABSTRACT

Environmental challenges and the lack of sustainable environmental management are evident all over the globe. Developing countries are more fragile to environmental effects due to their high dependency on natural resources together with existing problems as poverty, water scarcity, political conflicts and low adaptive capacity to climate change.

The lakefront in Kisumu, Kenya, struggles with several environmental challenges, where most problems are caused by human impact. A lack of environmental awareness together with the need for livelihood possibilities is the main reason for ongoing environmental degradation. Existing activities damage nature but are at the same time essential for people's livelihood, due to the high level of poverty and lack of employment opportunities.

The aim of this thesis is therefore to investigate current environmental challenges connected to unsustainable behaviour at the lakefront, on Luangni Beach. The aim is furthermore to explore and test how a design proposal can deal with environmental challenges at the site, strengthen the link between people and nature and introduce new environmental friendly income possibilities.

The study is performed through literature studies and eight weeks of field studies in Kisumu. The proposal consists of a master plan over Luangni and a description of related elements. The ambition of the thesis is to influence ongoing development plans, to emphasise and highlight sustainable development, where existing activities and resources are utilised.

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At last, thanks to all the stakeholders at Luangni Beach for being so hospitable and welcoming, and for giving me knowledge and insight in your life. Thanks to all the stakeholders interviewed for taking time, inspiring me and providing me with important knowledge for the thesis.



ABOUT THE AUTHOR

I have a bachelor's degree in spatial planning from Blekinge Institute of Technology. I am a Swedish student, currently within the master's programme of Design for Sustainable Development at Chalmers University of Technology. Through the master's programme my interest for sustainable urban design has evolved further with a particular interest in the environmental and social aspect.

Before I started my education I traveled around East Africa and Kenya which set the foundation for my interest in writing this thesis in an African and developing country context. I wanted to gather new experiences, to broaden my knowledge within the field of urban design, to get challenged by studying a new and rather unknown context. I also wanted to see if I could contribute and influence the ongoing plans, towards a sustainable and long term urban development.

Madeleine Larsson

ACRONYMS

KUP	Kisumu Urban Project (Urban development project financed by AFD)
AFD	Agence Française de Développement (French development aid organisation)
CBD	Central Business District (the city core)
ISUD-plan	Integrated Strategic Urban Development Plan (Visionary document for development of Kisumu)
KIWASCO	Kisumu Water and Sewerage Company Limited
KRC	Kenya Railway Corporation
NGO	Non Governmental Organisation
BMU	Beach Management Unit
UN-habitat	United Nations Human Settlements Programme
CBO	Community Based Organisations

DESCRIPTION OF WORDS

Hotel	Small simple restaurant with Kenyan food, serving only one or two dishes
Informal settlements	Unplanned residential area that lacks adequate infrastructure
Permanent structure	Stable building often made of concrete or bricks
Temporary structure	Simple structure of wood, sometimes also with iron sheets
Slum area	Residential area that lacks basic services for human well-being
Tuk tuk	A motor driven rickshaw on three wheels mostly used for taxi services
Pikipiki	A motorcycle providing taxi services
Boda-boda	A motorcycle or a bicycle providing taxi services
County	Kisumu County Government
Greywater	Is the recycling of 'waste' water that is generated in homes and commercial buildings through the use of water for laundry, dishes, or for bathing.
Blackwater	Wastewater containing bodily or other biological wastes, as from toilets, dishwashers, or kitchen drains, and kept separate from greywater in wastewater recycling systems.
Brownwater	An inland or coastal waterway especially when murky or colored brown by silt, tannins, or pollutants



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DISPOSITION

This booklet has four chapters, every chapter ends with concluding remarks. The booklet starts with an introduction which describes the chosen topic, the aim of the thesis and how the research was conducted.

In the following chapter the background is described, to provide knowledge about the context in which the thesis takes place. The second chapter also contains a description of design approaches that worked as inspiration for the proposal.

The third chapter includes the site analysis and starts with a broader scale on the whole lakefront and ends up on a more detailed scale of the chosen site at the lakefront, Luangni Beach.

In the final chapter the design method, objectives, strategies and proposal over the chosen site at the lakefront are illustrated.

Finally, concluding remarks and reflections are presented.





1

INTRODUCTION

This chapter contains the backbone and framework of the thesis with the subject and the aim of the research, the framing questions, delimitations, approach and methods.

SUBJECT

GLOBAL

Environmental challenges and the lack of sustainable management of the environment are evident all over the globe. Climate change together with environmentally unsustainable patterns and overuse of natural resources hampers countries development efforts and is highly effecting people's livelihoods. It results in a degraded environment with biodiversity loss, pollution, increased acidic oceans, flooding, landslides, deforestation and desertification amongst others. The worldwide increased population growth lays even more pressure on an already fragile environment (The World Bank Group, 2012).

Existing challenges as poverty, water scarcity, political conflicts, ecosystem degradation and low adaptive capacity to climate change makes developing countries and the African continent even more fragile to environmental effects compared to developed countries. People in poverty and in developing countries are directly more dependent on natural resources for household food security, since most of the used resources are locally made. Degradation of natural resources is closely linked to a decrease in production and income which in turn results in a lack of available food (International Fund for Agricultural Development (IFAD), n.d.).



“...there has been significantly less progress in managing the environment sustainable. While developing countries will still need rapid growth to reduce poverty over the next decade, the global environment has reached a critical state that could undermine livelihoods, productivity, and global stability. ”

(The World Bank Group 2012, pp. 1,2)

KISUMU AND THE LAKEFRONT

The previously mentioned environmental challenges, the vulnerability to environmental effects and dependency on natural resources are most evident also in Kisumu, Kenya. There is a fast growing population along the shoreline of Lake Victoria which creates an increased pressure on an already fragile and degraded environment. Subsequently there are already several environmental effects that can be seen in Kisumu, as the high level of pollution in Lake Victoria, threatened wetlands by encroaching farms, the overuse of firewood that causes soil erosion and increased surface run-off, overfishing as well as erosion from the mountainous region in the north causing flooding in the lake and airport. All of these challenges have in some way affected peoples ability to make a living and the need for other income possibilities are evident.

Several of these effects are caused by environmentally unsustainable patterns where a major part originates from the lack of knowledge and thereby a distrust of the crucial significance that human impact has on the environment. The lack of environmental awareness can even be seen in the urban planning and legislation for land use where little emphasis is laid on the environmental aspects (UN-Habitat), 2004a; UN-Habitat, 2012b; UN-HABITAT, 2006c).

This thesis is an attempt to address some of these issues on a specific site, Luangni Beach, at the lakefront in Kisumu. This site is chosen because of the obvious environmental degradation taking place there, due to harmful activities, and the lack of sufficient income bringing activities.

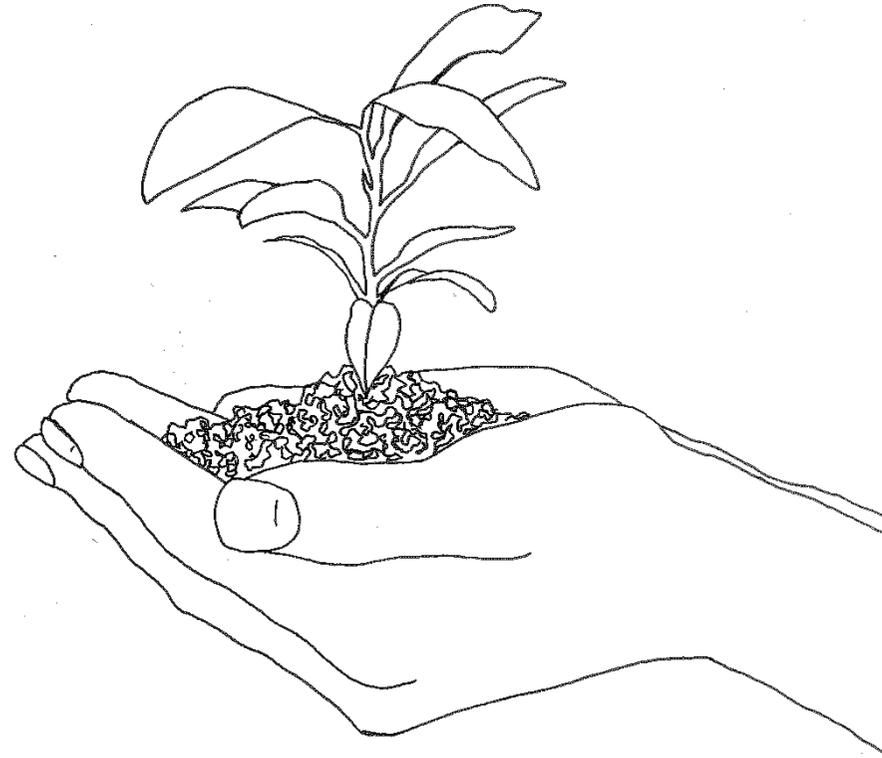


AIM

The main aim and backbone of this thesis is the focus on environmental challenges and awareness. The aim is to investigate current environmental challenges caused by human impact, with a focus on the issues along the lakefront in Kisumu, Kenya.

It is also to explore and test how a design proposal can deal with the environmental challenges, raise environmental awareness, and provide possibilities for sustainable livelihoods, at a chosen site along the lakefront.

The diagram displays which challenges that will be explored and which will be both explored and addressed throughout the thesis.



The main aim of this thesis is to explore how the connection between people and nature can be strengthened at the lakefront. Furthermore, encourage to environmental friendly lifestyles and sustainable income possibilities.



FRAMING QUESTIONS

The framing questions for this thesis is based on visions for sustainable development with a focus on the environmental- and social aspect, which are the framework and guidance for the thesis.

How can environmental challenges at the lakefront in Kisumu be addressed, meanwhile supporting sustainable behaviour and livelihoods?

How can environmental challenges caused by human impact be addressed, through spatial planning at the lakefront in Kisumu? Challenges addressed are:

- > The carwash directly into the lake which causes pollution and creates an unpleasant appearance.
- > Poor waste management with lack of reuse of waste water and solid waste.
- > The use of firewood for cooking that causes deforestation, increased surface runoffs and flooding.
- > The invasion of water hyacinths causing boat tour companies to migrate to other shores.
- > The lack of collaboration and understanding between land owners, officials and actors on site.
- > The poor collaboration between the groups of actors at the lakefront.

How can spatial planning contribute to raise environmental awareness and encourage sustainable lifestyles? Challenges addressed are:

- > The mental gap between people and nature.
- > The lack of knowledge about environmental impact from unsustainable waste management, firewood as cooking fuel and pollution.
- > Low level of knowledge about nature and natural cycles.
- > The poor physical access to the habitat at the lake due to safety issues and physical barriers.

DELIMITATIONS

The thesis is focused on an in-depth analysis and an urban scale proposal at a specific site, Luangni Beach, which is situated in the examined context at the lake front in Kisumu. This enables to work in-depth with the site and illustrate how it in this context can be dealt with in a sustainable way. However, the broader context is affecting the chosen site's preconditions and therefore the context have been taken into consideration as well.

A focus on the environmental- and the social aspect is made, in relation to the economical aspect. The focus will be on the effect that environmental degradation has on humans possibilities for sustainable livelihoods.

All these three aspects are interlinked and together they give the prerequisite for development of the site, which means that all of them will be dealt with in some way.

SOCIAL ASPECT

ECONOMICAL ASPECT

The economical aspect affects the ability for livelihood and the use of natural resources.

ENVIRONMENTAL ASPECT

THE LAKEFRONT SITE

THE BROADER CONTEXT

The local and national context is affecting the sites preconditions.

APPROACH & METHODS

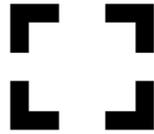
The approach used in this thesis is 'research for design' and 'research by design', which means that the research has been made by both background investigation and through the sketching and proposal making. To have sufficient background knowledge, a field study of eight weeks in Kisumu was performed, to analyse and get a deeper understanding of the national context, the local context and the site.

The first step is to identify the problem, framing the question and the content of the thesis. Next step is to collect material, that in the third step is analysed and compiled. Based on the analysed material, the idea, objectives and strategies is developed, which is used as a frame for the development of the design proposal. The final step is to reflect and evaluate the process and the final outcome. The process is made step by step as the illustration displays. However, along the process it is necessary to alternate between the different steps, which results in the four middle steps running parallel throughout the process.

THE PROCESS

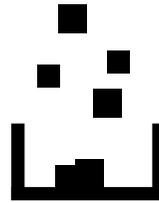


THE DIFFERENT STEPS IN THE PROCESS



AIM & FRAMING

Formulating a framework for the thesis, with the issue to deal with, the aim of the thesis, framing questions, delimitations, approach and methods to have a clear direction to follow and to narrow the scope.



COLLECTING MATERIAL

Collecting material, suitable literature, documents, pictures, diagrams, interviews, urban and site analysis.



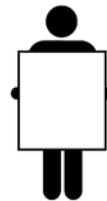
ANALYSING & COMPILING

Continuously analyse, compile and organise material that are gathered.



IDEA, OBJECTIVES & STRATEGIES

Develop the idea with objectives based on gathered knowledge from the analysis. The design objectives are giving directions for the strategies.



DESIGN PROPOSAL

Create a more detailed design proposal based on the objectives and strategies for development of the site.



REFLECTIONS

Evaluation and reflections on the process, the outcome and potential areas for further research.

WHICH METHODS AND WHY

The research and material in this thesis are based on different methods, such as literature studies, urban analysis, site analysis, observations, interviews and sketching the proposal. Based on the analysis a sketch process with the design proposal of a master plan, sections and illustrations for a site at the lakefront in Kisumu is developed.

Literature studies are made by reading reports about the national, and local context, with a focus on the specific prerequisite of the site and on the environmental challenges and awareness connected to income bringing activities. Reports about on-going and future development plans with a focus on the lakefront. Research through books and internet-based resources about design approaches, reference projects and design solutions that deals with environmental challenges and environmental awareness are made.

The **urban analysis** is made to map the character of the lakefront. SWOT analysis is made over the lakefront to find out internal strength and weaknesses and external opportunities and threats that could affect the site.

Site analysis is made by observations, inventories, and interviews.

Observations and inventories are made to map strength and weaknesses, character, sense of place, sound, important elements, activity, functions, use, barriers and movement, during different times of the day, weekdays and weekends.

To gather a deeper knowledge of the local situation, ongoing and future plans, initiatives, issues and opportunities relating to the site, different kinds of **personal communication** with people are made. Both fully structured and prepared interviews, mainly with officials, but also semi-structured interviews, with some questions prepared and some developed under the interview. Several spontaneous and unprepared conversations with people at the site are also made. The consulted persons are for example; officials at the County, UN-habitat and UNEP (United Nations Environmental Programme), CBOs at the site and others with a focus on environmental challenges, landowners of the site and other stakeholders that has an interest in the site (see reference list).

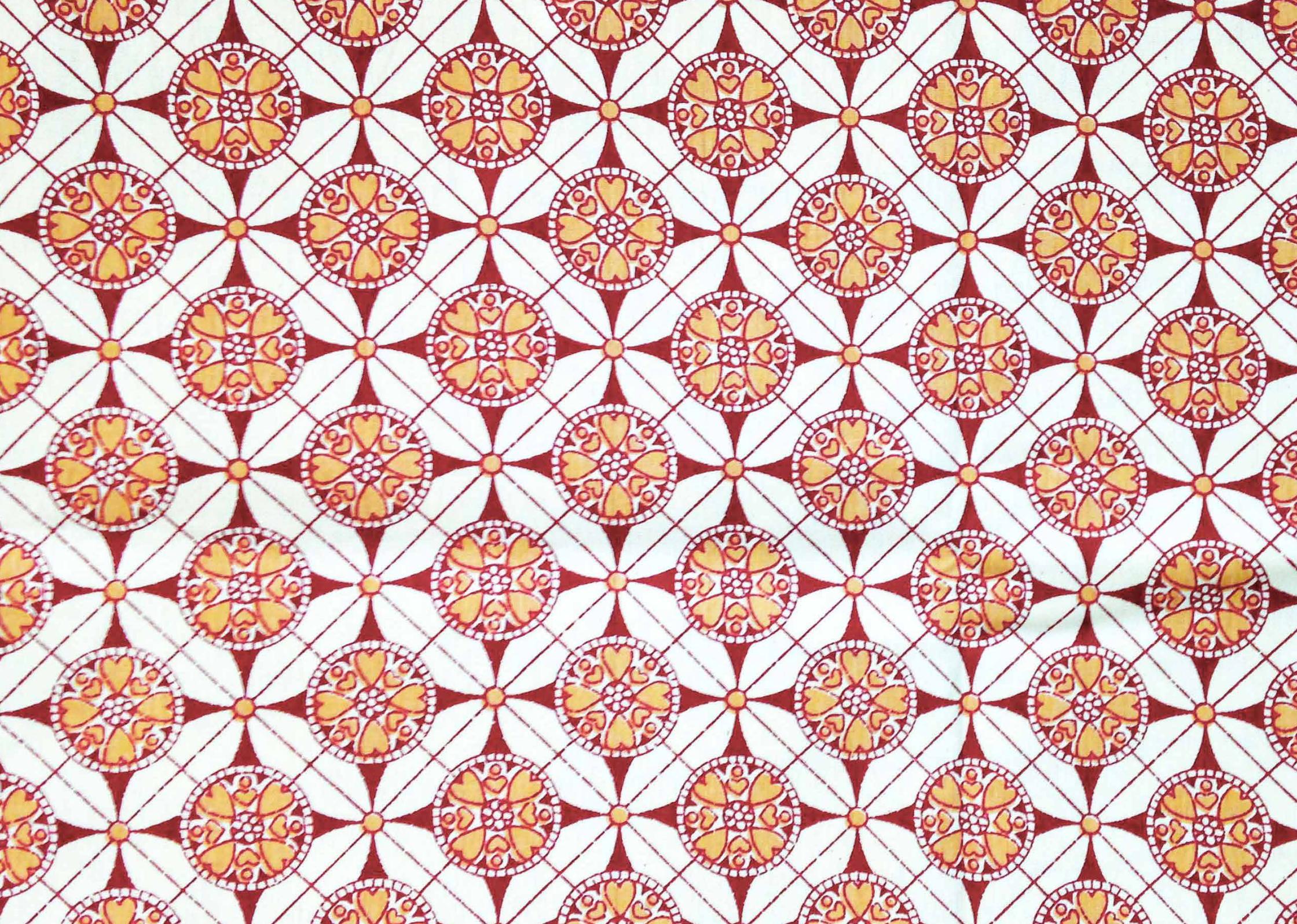
The final proposal is made based on the background analysis and it is the outcome of a **sketching process**, where different elements and solutions were tested and explored. The proposal is a product of how far I came in the sketch process and it should be noted that it is not obvious solutions but rather a first step towards a doable proposal.

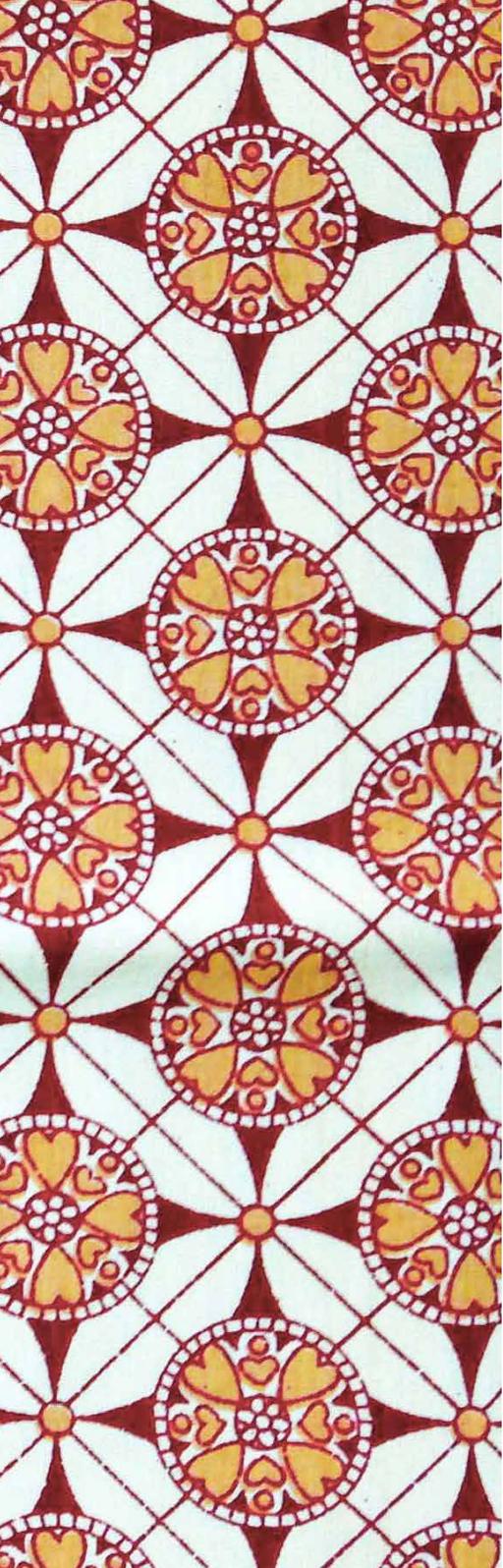


SUMMARY

The previous chapter contains the backbone and framework for the thesis with the subject and the aim for the research, the framing questions, delimitations, approach and methods.

The environmental aspect connected with the social aspect in a developing country context is explained, with most emphasis on unsustainable and harmful activities related to the lakefront area. Various methods are used and a field study in Kisumu are made to create a better base for the research.





2

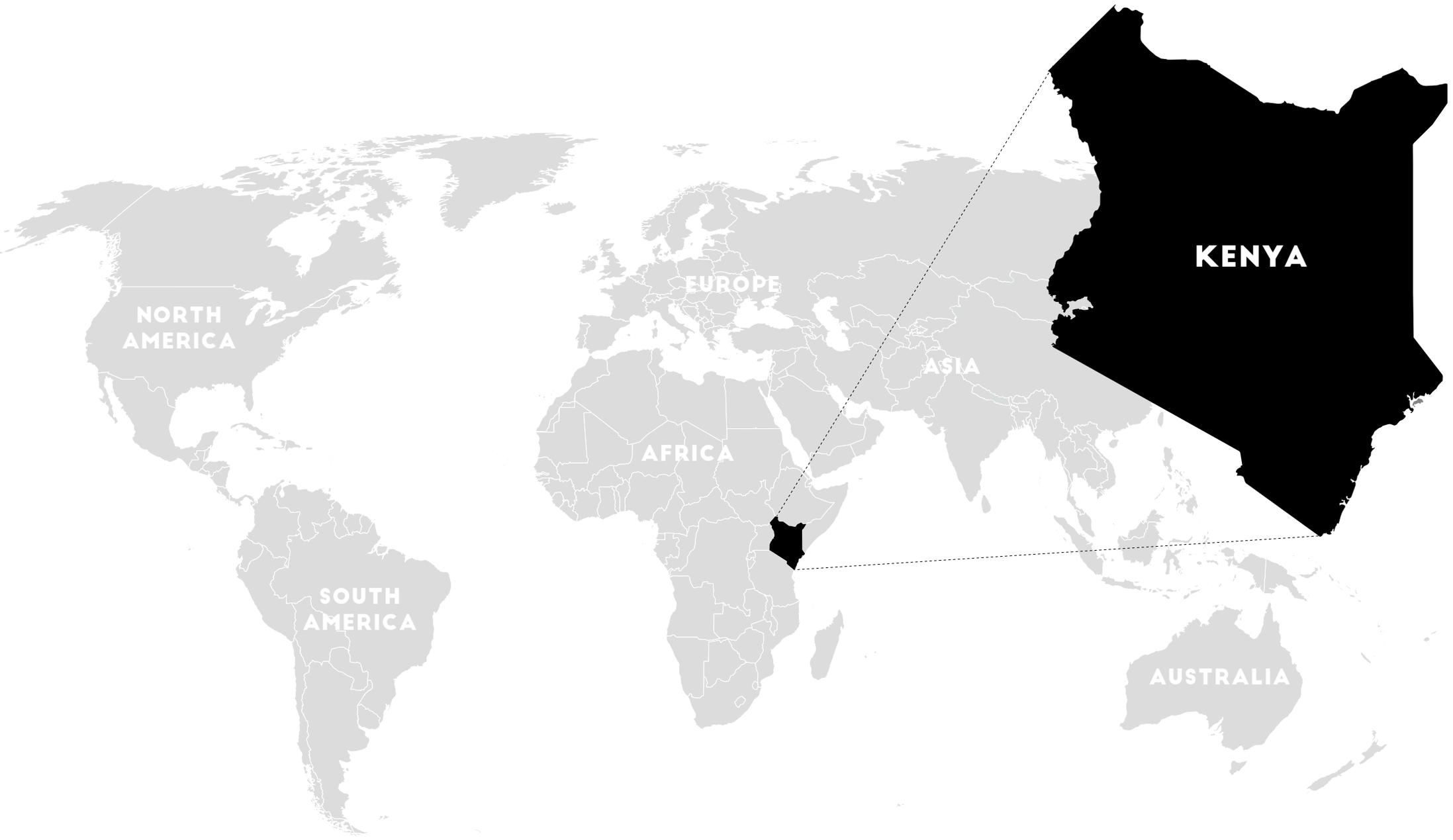
BACKGROUND

This chapter address the context in which the field study was made. Design approaches that have been used as inspirational source for the proposal is presented in chapter four. The chapter starts with a description of the national scale, followed by the Lake Victoria Basin area and ends in Kisumu at the city scale. In addition to the introduction and basic facts about each area, the main environmental challenges caused by human impact in Kisumu and Lake Victoria Basin are described.

KENYA

Kisumu is located in Kenya which is situated in east-central Africa. Kenya has approximately a population of 43 million inhabitants and a high population density, with around 74 inhabitants per km² (Nationalencyklopedin, n.d.). A comparison with Sweden's 24 inhabitants per km² illustrates rather well the high population density in Kenya, with triple as much inhabitants per km² (Norden, n.d.).

Agriculture is the main source of income for the majority of the population. The tourism industry and the manufacturing sector are also significant sources for livelihood. Since these activities are the main source of income in Kenya it makes the country vulnerable to international economic fluctuations. After a few years of economical growth the Kenyan economy started to decline due to the international financial crisis and the riots at the election in 2007 (Nationalencyklopedin, n.d.).



**NORTH
AMERICA**

**SOUTH
AMERICA**

AFRICA

EUROPE

ASIA

AUSTRALIA

KENYA

KENYA

Kenya is neighboring several countries: Somalia, Ethiopia and South Sudan in the north, Uganda in the west, and Tanzania in the south. It is situated right at the coast to the Indian Ocean with the second biggest city Mombasa located at the shoreline, which also is the country's main harbour. Nairobi is the capital and is situated in central Kenya, in between Mombasa and the third largest city Kisumu with approximately 400 000 inhabitants. Nairobi is also the biggest city in the whole East African region (Nationalencyklopedin; Nodalis Conseil, 2014; UN-HABITAT n.d.).

The Kenyan population includes several different tribes, where the main communities are Luhya, Luo, Kisii, Kuria, Maasai, Suba, Kalenjin and Teso. In urban centres as Kisumu there is a mix of indigenous people, although a majority are Luo and there is also a high amount of settlers originating from India (The United Nations Environmental Programme (UNEP), 2006).



SOUTH SUDAN

ETHIOPIA

SOMALIA

UGANDA

KISUMU

NAIROBI

RWANDA

BURUNDI

TANZANIA

MOMBASA

LAKE VICTORIA BASIN

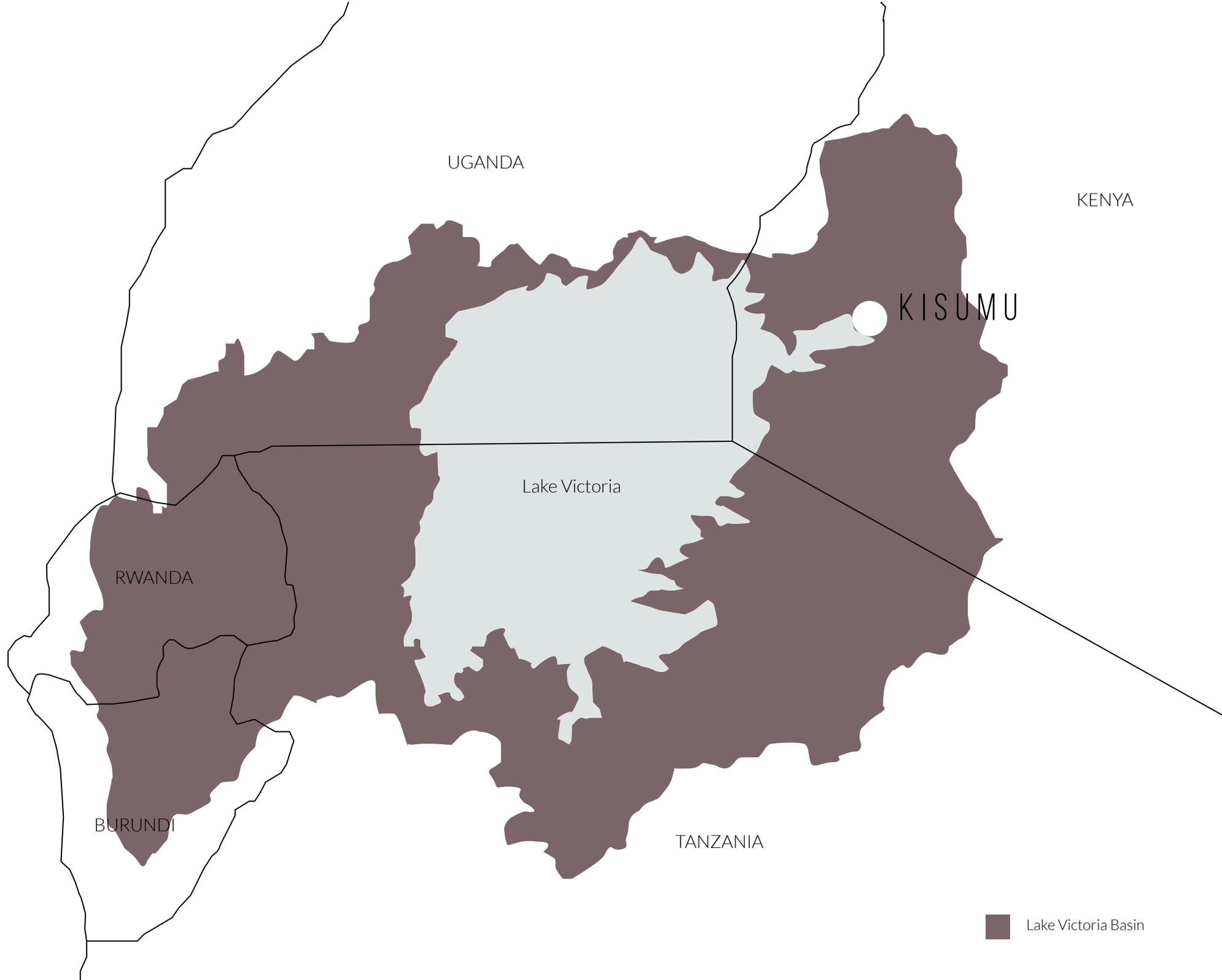
INTRODUCTION

Kisumu is located right at the shores of Lake Victoria Basin, which occupies an area of about 251 000 square kilometers, of which 69 000 square kilometers is the lake itself. Lake Victoria is the largest freshwater lake in Africa and the second largest in the world. The lake borders three different countries: Kenya, Uganda and Tanzania, and the basin stretches over five countries (UNEP, 2006).

The lake has a rich biodiversity, with the main habitats of the basin being fish species, birds, higher vertebrates, as amphibians, reptiles and mammals together with several plant species (UNEP, 2006).

Kisumu's inhabitants as well as the rest of the population within the basin are highly dependent on the natural resources provided by the habitat of the lake for their livelihood; both the land-based and the aquatic resources. The basin with its favorable conditions for agriculture, fishing and other economic activities have attracted 30 million people to settle down there. Lake Victoria Basin supports one of the densest populations in the world with an average of 549 persons per square kilometer in Kisumu. Furthermore the urban growth rate is among the highest in the world. Among these economic activities, the freshwater fisheries make a vast contribution to the export earnings. Lake Victoria has the most productive freshwater fishery in the world, with an annual fish yields in excess of 500 000 tones worth 600 million US dollars annually (UNEP, 2006).

The ethnic composition of the indigenous people around the lake is diverse but they share similar livelihoods. The energy source widely used by the population for livelihood around the basin is traditional biomass energy, as firewood, charcoal and agricultural residue (UNEP, 2006).



UGANDA

KENYA

KISUMU

Lake Victoria

RWANDA

BURUNDI

TANZANIA

 Lake Victoria Basin

LAKE VICTORIA BASIN

ENVIRONMENTAL CHALLENGES

The lake has several problems with environmental degradation caused by human impact and unsustainable behaviour. It creates a vicious circle where humans are degrading the environment which in its turn affect the humans through decreased amount of usable resources (UNEP, 2006).

The lake is highly polluted. A significant reason for this is the lack of proper waste water treatment facilities for factories and sewage systems in urban centres surrounding Lake Victoria Basin. This load of pollution leads to rapid growth of alien invasive species as the water hyacinth, which causes biodiversity loss. Thereby also affects the fish stock and the fisheries which are an essential source of income for numerous people. The pollution has moreover caused rampant waterborne diseases, as bilharzia, which can be a deadly disease (UNEP, 2006).

Overdevelopment in areas of vegetation have exposed soils for both wind and water erosions. Overconsumption of timber, unsustainable agriculture practices, increased energy demand, introduction of terrestrial invasive species and lack of appropriate technologies for forests and woodland conservation has caused rapid adverse changes in forests and woodlands. Climate change has affected the hydrological cycle of the basin, and with higher temperatures the risk of malaria increases, since it enables the mosquitoes to inhabit higher altitudes (UNEP, 2006).

The vast population together with the rapid population growth within the basin lays even more pressure on an already fragile environment (UNEP, 2006). All of the above described environmental challenges are also evident in Kisumu and will be discussed in the next coming pages.



Water hyacinths invading the shores of Lake Victoria.

KISUMU

INTRODUCTION

Kisumu is the third largest city in Kenya, formed in 1901 together with the development of the railway. The name Kisumu originates from the local word Kisuma which means barter trade. After the establishment of the city it developed in line with its name into a commercial, industrial and transportational hub for the Lake Victoria Basin. Connections by rail and waterways was established to Tanzania, Uganda, Rwanda and Burundi, and furthermore within the country to Nairobi and the harbour city Mombasa (Nodalis Conseil, 2014; UN-Habitat, 2006).

From the 70's the city has grown from around 100 000 inhabitants to currently around 400 000, where around 39% are living in informal settlements. The city is growing at a rate of 4% per year and is projected to reach half a million inhabitants by 2018 and before 2050 as much as a million inhabitants.

Kisumu still has an essential role as a trading and service centre, although there has been a progressive decline since the 70's. The main reason for this decline is the general decline in the national economy, with a stagnating economy, soaring unemployment and increased poverty. Several industries have performed badly and been forced to close down. The activity at the railway and port, which is located in the lakefront area, have steadily been declining. The railway are currently not in use, while the port are operating only on demand with cargo, and no passenger connections (Nodalis Conseil, 2014; UN-Habitat, 2006).

Since the port- and railway activity declined in the last decades other sectors has come to emerge, as tourism and service. The land

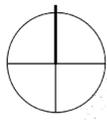
use planning have not been able to keep up and adapt to this rapid population growth and the shift towards other economical sectors, which requires other planning principles and guidelines. An example of this is the lakefront area with the inactive railway and nearly inactive port that still use one of the most attractive lands in Kisumu (Nodalis Conseil, 2014; UN-Habitat, 2006).

Kisumu has the highest level of food poverty among Kenyan cities. More than half of the population in Kisumu lives below the food poverty line, compared with Nairobi's 8,4%. Around 30% of the population is unemployed, and more than half of the population is engaged in activities in the informal sector, mostly within trade, transport, carpentry and other small scale businesses (Nodalis Conseil, 2014; UN-Habitat, 2006).

Only 47% of the demand for education is covered by the public sector and merely 25% of the urban poor have gone through secondary school (Nodalis Conseil, 2014; UN-Habitat, 2006). The low level of education amongst inhabitants of Kisumu are presumably one factor for the lack of environmental awareness and sustainable use of nature.

Only 0,9% of the land use is green spaces, which indicates the need for adding recreational green spaces into the urban landscape. The public realm overall in Kisumu is poor and suffers from a lack of maintenance and investments. Green spaces are insufficient both in numbers and quality (Nodalis Conseil, 2014).

BUSIA/UGANDA



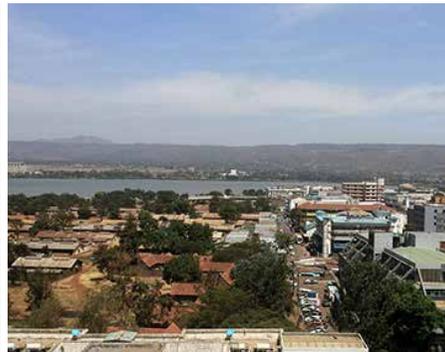
AIRPORT

CBD

RAILWAY
& PORT

NAIROBI

NAIROBI



KISUMU

ENVIRONMENTAL CHALLENGES

Kisumu is facing several environmental challenges where many are caused by human impact. Substantial amount of these challenges are affecting the lake, its habitat and the lakefront. However, a desire to work towards a sustainable and long term development can be seen among many initiatives and CBO's in Kisumu.

During heavy rains the mountainous region in the north of Kisumu suffers from erosion that leads to flooding in the city, the lake and the airport. This is mainly caused by development of housing on the mountains, which has replaced the vegetation cover that absorbs and slows down stormwater and controls flooding ("Mainstreaming Cleaner Production", 2004; UN-Habitat, 2012).

Lake Victoria is gradually decreasing in water level. Six rivers flows into Lake Victoria in Kenya and these are about to dry up, which in turn decreases the amount of water flowing into the lake. Furthermore heavy use of river waters upstream is denying the lake to recharge waters (UN-Habitat, 2012).

The lake is not only decreasing in water level it is also heavily polluted by for example: oils from carwash, direct discharge of waste water and solid waste from both industries, households and agriculture. The water hyacinth, is widely spread in the lake, due to pollution. The contaminated water together with the overexploitation of fish has caused a severe decline of fish stock. This has made several fishermen unemployed and forced them to find other ways for

income. Furthermore, fish from the lake accounts for 90% of the country's fish export and is therefore an essential contributor for the national economy. The hyacinth is also causing reduced water quality, blockage of waterways which hampers fisheries, agriculture, hydro-power and recreation ("Mainstreaming Cleaner Production", 2004; Nodalis Conseil, 2014; UN-Habitat, 2012).

Solid waste management is a major challenge for Kisumu. Only around 20% of the solid waste is collected by the local authorities while 27% is collected by private entrepreneurs and 53% is uncontrolled, meaning that it is either left on the ground or burned at site. The plastic disposed in open spaces often blocks stormwater drains which causes flooding (B. Nyakinya, personal communication, March 9, 2015)

Kisumu is furthermore suffering from inadequate water supply and much of the water supplied is contaminated, especially in the informal settlements. The sewage system and the storm water management are both insufficient and worn out and are in need of an upgrade (Nodalis Conseil, 2014).

The national legislation that regulates development along the shoreline is seldom implemented and there is a lack of updated riparian maps to guide developments. This negatively effects the wetlands with expanding development and degradation (UN-Habitat, 2012).



DESIGN APPROACHES

ECOLOGICAL DESIGN

One of the fundamental design principles for ecological design strives from the perception that nature, natural cycles and technological processes have been hidden from our everyday awareness, by the progression of dumb design. That designed environments today are not showing how technology supports us and are interlinked with nature. For example the sewage plants, garbage dumps, above ground gas storage tanks, slaughterhouses, and electrical generating, transmission stations and even wind generators are often located in the poorest parts of town where it is not visible for public view. Another example is the conventional storm-drain system which leads the flow of water straight down under ground after picking up toxins along the way. This hides the water and further the impact of the designed system, with contamination of downstream rivers or wetlands, altered hydrology, and decreased groundwater recharge. The loss of visibility of natural processes has created a lack of awareness and connection to the environment and of our activity and use of natural resources (Van der Ryn & Cowan, 2007).

An essential principle for ecological design is about improving the connection between humans and nature.

Making the nature and natural cycles that support all life visible and highlighted through design, instead of hiding them. It enlightens and contributes to a better understanding and connection to nature. It can inform us of the ecological consequences of our use and activity on earth. Highlighting and displaying nature and natural flows such as wind, rain, sun, shadow, climate, seasons, the source of our food, life-cycles of materials. This principle is also closely interlinked with 'Biophilia', which is a belief that humans have a need for contact with a wide variety of species and are meant to live and adapt within nature (Van der Ryn & Cowan, 2007).

Making nature visible and creating a designed system that is ecological functional is surely possible, by for example letting water flow on the surface into drainage ponds, absorb stormwater by wetlands and stream corridors, that would work as a sponge and cleaning the water. It is a design approach that links people and nature. It is designed environments that people can enjoy, watch visually and through interaction it becomes an easy and fun way of being enlightened about nature (Van der Ryn & Cowan, 2007).

"Effective design helps inform us of our place within nature."

(Van der Ryn & Cowan 2007, pp. 185)

"De-natured environments ignore our need and our potential for learning. Making natural cycles and processes visible brings the designed environment back to life."

(Van der Ryn & Cowan 2007, pp. 180)



Open storm water channel highlighting water flow in Le Creusot, France (Llorca, n.d.)

BIOPHILIC DESIGN

The biophilic design approach lays emphasis on the importance of keeping and enhancing nature into our urban environments. A biophilic city is where people want to spend time outside and enjoy nature. Where people care about the environment and works actively to preserve it. Nature is key in this approach where guidelines for urban design and planning lays emphasis on this aspect. That nature should be a centerpiece, not an afterthought when planning cities. That natural elements should be incorporated in everything we design or build to a far greater extent (Beatley, 2011).

The approach originates from a notion that nature has a great power over humans wellbeing and that it is essential to incorporate in our living environments. Humans have lived with nature for most of our history as the hunter-gather society, but the connection with nature has been erased in just a few thousand years to be replaced with a “machine- regulated world”, as it is named in the book. The link between humans and nature are dependent on cultural support from the society, sufficient experience and knowledge to recognise and nurture this connection. It is a belief that nature in our lives are not optional but essential (Beatley, 2011).

Many studies and arguments in which nature plays an essential role for humans are described. For example where people in close relation to nature have healed faster

from diseases and that nature reduces stress, enhances a positive spirit, improves cognitive skills and academic performances, further helps to mitigate the effects of childhood illnesses as ADHD. There is a clear relationship between green elements in urban environments and higher levels of physical and mental health. Green elements also moderate and reduce temperature and heat island effects in urban hard-surfaced environments. Furthermore, cleans the air from pollution and creates increased air quality. Even the economical value of green urban elements have proved to be beneficial, it stimulates investments by attracting complementary uses, as e.g. commercial and residential developments. By e.g. creating a wetland it can prevent environmental hazards, as hurricanes and flooding, which can cost tremendous amount of money (Beatley, 2011).

It is described that nature in our living environments can furthermore effect our behaviour in several ways. One of the effects is that exposure to nature strengthens the commitment and willingness to live a more sustainable lifestyle. Surveys have shown that “nature protective behaviours” are dependent on our connection and affinity for nature and how frequent we experience nature. That if natural elements is incorporated in urban environments, it will offer a deeper understanding of nature, of animals and plants life cycle, of biology, which in turn will reshape our notion of cities (Beatley, 2011).

"A biophilic city is a city abundant with nature, a city that looks for opportunities to repair and restore and creatively insert nature wherever it can. It is an outdoor city, a physically active city, in which residents spend time enjoying the biological magic and wonder around them. In biophilic cities, residents care about nature and work on its behalf locally and globally."

(Beatley 2011, pp. 2)

"Paying attention to the animals and nature around us, educating about their presence and making room for them, and restoring and repairing urban habitats have the great potential to make cities magical."

(Beatley 2011, pp. 15)



A previous airport turned into an international wetland. Salburua wetlands, part of the greenbelt for the city of Gasteiz, Spain (Beatley 2011, pp. 74).



SUMMARY

Kisumu is located within the Lake Victoria Basin and has similar preconditions as many communities around the lake. In Kisumu where the chosen site is located there are several severe challenges but also opportunities and initiatives working towards a sustainable future for Kisumu.

The unemployment rate is high and a majority of activities are in the informal sector, which displays a vast entrepreneurship spirit and engagement to find sources of income among people. The food poverty rate is among the highest in whole Kenya, which shows the vast need for further income possibilities.

There is a lack of sufficient education possibilities, which results in a low level of knowledge and presumably also affecting the level of environmental awareness. There are several environmental challenges facing Kisumu, most of them caused by human impact and in turn affecting peoples livelihood possibilities. Some of the challenges are erosion, flooding, pollution in the lake, drying up lake, invasive species affecting several aspects, declined fish stock, decreased vegetation and wetlands due to development.

The public realm in Kisumu is poor with negligible amount of green spaces and a lack of maintenance. The solid waste management is poor and the water supply is inadequate. The new sectors that are gaining ground with tourism and service has potential to be developed and provide more income possibilities.

The design approaches, ecological design and biophilic design describes how nature once again can be a part of the city and human lives. How to design through interaction with nature and create spaces that can raise environmental awareness and a responsible use of nature.





3

SITE ANALYSIS

This chapter will introduce and guide through the site, starting at a larger scale which includes the whole lakefront, followed by a more thorough analysis on the area of focus, Luangni Beach.

Basic background information and the character of different areas at the lakefront are discussed. A SWOT analysis and a discussion about ongoing plans for the lakefront are made. The context of Luangni Beach is described, as well as the strengths and weaknesses, functions and uses, the stakeholders, movement, access and mental barriers. Following chapter is based on material gathered from interviews, site visits and inventories.



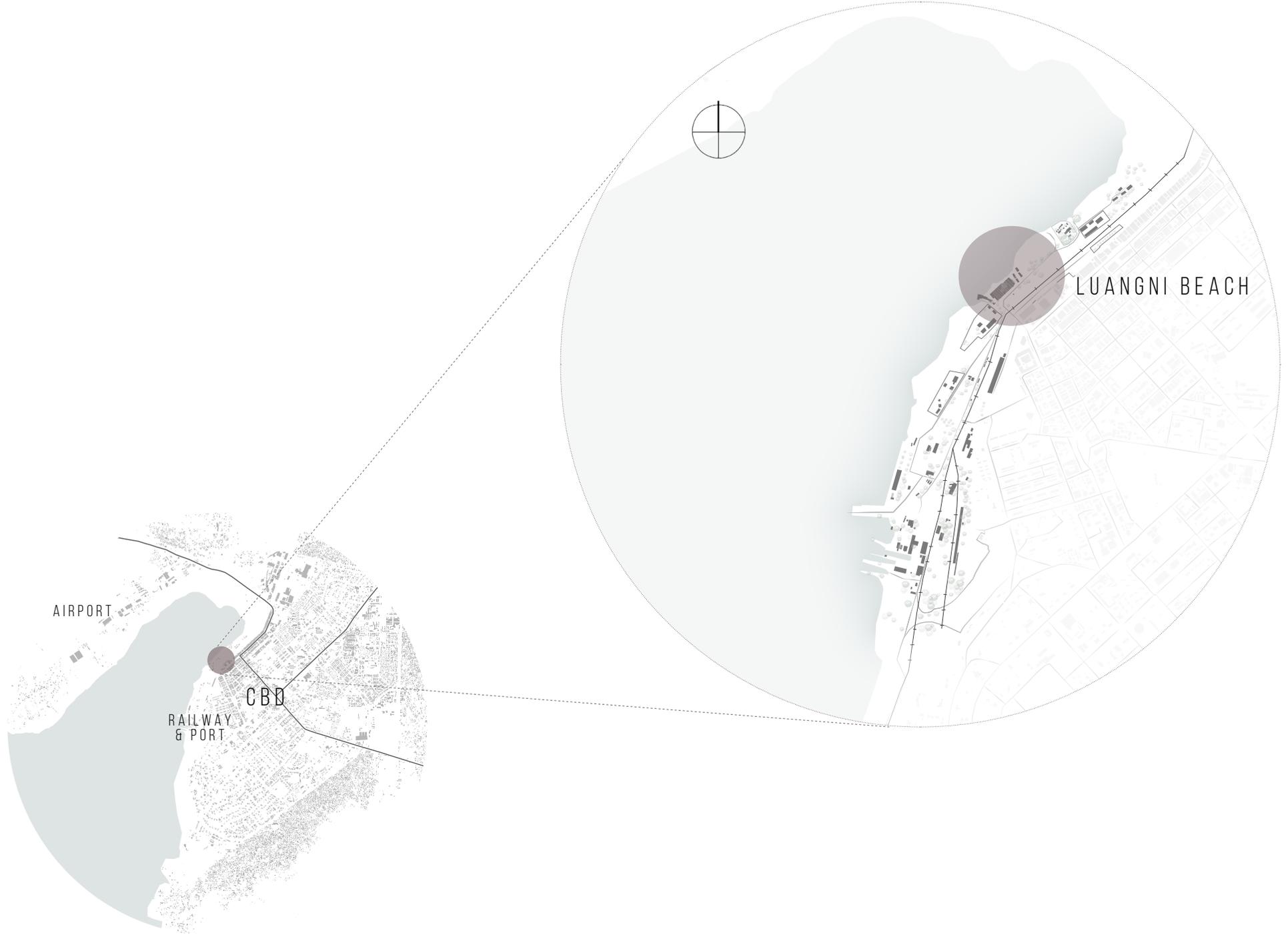
THE LAKEFRONT CONTEXT

LOCATION

Lake Victoria and the lakefront adjacent to the CBD is a major asset for Kisumu, which could appeal visitors as well as being an attractive meeting place for the citizens. However, today the city is turning its back towards the lake. There is a lack of connectivity between the city centre and the lakefront due to interrupted paths, fenced areas in connection to the inactive port and railway. Furthermore, there is a lack of functions that could provide reasons to visit the area. There is no planned public atmospheric meeting places along the shoreline.

The geographical borders chosen for the lakefront in this thesis is based on the ISUD-plan over Kisumu, the strategic document for development of Kisumu. The land owners and the County in collaboration with UN-habitat are currently planning for development of the lakefront area. In the time of writing the lakefront development are in the process of being approved by the county assembly and there is a desire to find a person that will manage and run the lakefront project forward.

One specific part of the lakefront has been chosen as the focus area in this thesis; Luangni Beach, which is directly connected to the CBD as well as the railway and port area.



CHARACTER

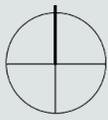
The lakefront consists of several different characters, when comparing the sense of place, aesthetic appearance, function and use. The areas adjacent to Luangni Beach are described in the following paragraphs, which aims to give an understanding of the context that the focus area is situated in. The description of these areas is divided in six parts based on the different characters they bear.

Kichinjio Beach is the northern part of the lakefront. Situated here is the BMU, the beach management unit which is managing all beaches along the lakefront. There are a few small scale fishing activities here, although since the fish stock decreased they can currently only catch small fishes for drying. The Tilapia fish which the hotels serve, is difficult to catch nowadays.. Still the nets are lying on the ground and people are working to clean the dried fish. Further north is a lush and green area with cultivation for domestic use and some fish-farming ponds.

The activity level at **the port** is minimal, shipping is only operated on demand and most activities consists of guided tours, which departs within an enclosed and fenced area. The area is of vast scale and stretches along the water of approximately 1,5 kilometers. It is only

possible to access the area through paying an entrance fee, which means that this extensive area of the lakefront is not accessible for the public. The port has a rather rough industrial character with an old cargo railway, silos, abandoned wrecks and some one storey permanent structures, there are also some greenery, but mostly it is an open space with a lack of vividness. In the southern part there is a marine school under construction, also an enclosed and fenced area that prevents access to the lake. In between the rough industrial spaces there are some rather large areas with greenery.

The railway station has an industrial sense of place, although not as rough as the port. It is a large open space with elongated one storey permanent structures of brick. Except the railway station which have a more varied expression, although also a permanent structure of brick. The railway is currently inactive and an empty and abandoned feeling appears when entering this area, with virtually only monkeys jumping around. The railway is currently only used as a walking path, presumably because it is the fastest way to get around by foot between some places in the area. There is one building which is occupied as an office space for the Estate Chief for KRC.



KICHINJIO BEACH



PORT



RAILWAY STATION



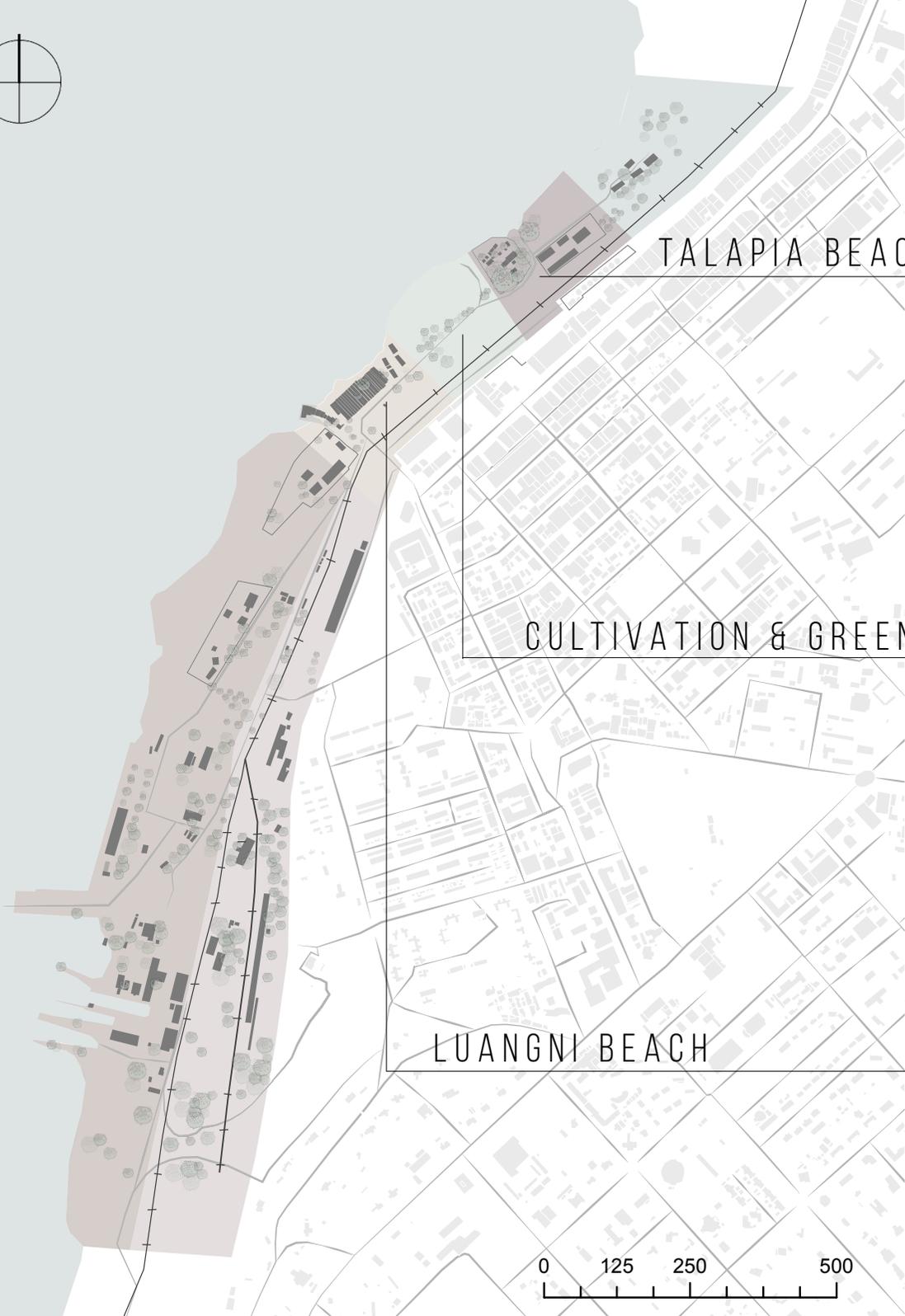
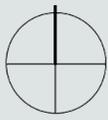
CHARACTER

Tilapia Beach located in the north next to Luangni Beach have a restaurant in a permanent structure, in a well organised space behind fenced walls. The KPLC power store is located next to it, with an industrial expression. The restaurant with its wall all the way down to the lake blocks access to the lake and prevents potential paths along the lake.

The cultivation and green area is used for domestic use by locals from different areas around Kisumu. The soil is good and moist next to the lake and they can use water from the lake to irrigate the crops. The sense of place is calm and rather empty of activity from people, except the ones that cultivate. It is a lush and green area with not only farming, but also papyrus and other aquatic plants which give a rich biodiversity.

Luangni Beach is the most active and vivid place along the lakefront and contains a variety of activities and businesses. Almost all the land within the area is developed or hosts some kind of activity, which means that there is not a great amount of greenery here. It is a vivid and dynamic space, where a lot of things are happening.

The focus area for this thesis is Luangni Beach and the cultivation area. The chosen area is described further later on, starting at page 66.



TALAPIA BEACH



CULTIVATION & GREENERY



LUANGNI BEACH



SWOT

+ STRENGTHS

- Situated directly by the lake and water
- Directly connected to the city core (CBD)
- Several viewpoints with visual access over the area and lake
- Small scale cultivation enhances mixed use, greenery and food security
- Existing activities at Luangni creates vividness and provides livelihood opportunities
- Rich amount of greenery with a variety of expressions
- Luangni Beach is a popular tourist destination
- The port and Luangni Beach is a popular destination for local schools to visit
- Several existing vacant buildings which can be refurbished and transformed into new functions

- WEAKNESSES

- Lack of public spaces
- Lack of activity and vividness at port- and railway area
- Lack of planned public meeting places and places to sit and rest
- Cultivation and the greenery area creates a barrier to the water
- Major unwelcoming, gated and fenced areas creates barriers to access the shoreline and causes interrupted connections
- Unsustainable behaviour and degradation through overfishing, carwashing directly into the lake, disposal of garbage and urination directly into the nature
- Rainwater runoffs causing erosions and flooding
- Invasion of water hyacinth make it hard to maneuver boats
- Overfishing and pollution causing a decreased fish stock and loss of job and income possibilities
- Lack of and interrupted connections within the area and between the CBD and the lake
- Several areas that are unsafe with the risk of being robbed
- Lack of light sources creates a feeling of being unsafe when dark falls
- Major attractive area along the lake occupied by an inactive railway and a port with low activity

+ OPPORTUNITIES

- Globalisation, international initiatives, innovative ideas, spread by social media to attract a wider range of visitors, which can bring further income possibilities
- Possibilities for implementation of new sustainable innovations, renewable energy, recycling, reuse and treatment of water and sustainable use of natural resources
- Major amount of resources available with potential to be reused and recycled
- Activities and an environment that has major potential to attract international tourists and eco tourism
- Great amount of land at a strategic location, that has potential to be developed into a vivid and appreciated place in connection to the lake
- Existing activities in Luangni provides vividness and life to the area. Activities which have potential to be developed and work in a sustainable way
- Strategic location and proximity to CBD and the lake with potential to be linked together
- Major areas nearby the shoreline which is not used for its full potential. Opportunity to provide the public a recreational area right at the lake.

- THREATS

- Disputes about land ownership and poor collaboration between stakeholders and officials threatens to prevent development of the area
- Pollution into lake from industries and domestic sewage system all around the lake, from several countries
- Urbanisation implies increased pressure on available land threatening to densify and not leave land for public use
- Climate change poses increased risk of flooding, higher temperature, loss of biodiversity, drought etc.
- Risk of gentrification and a homogeneous crowd, with too expensive and luxurious development

ONGOING PLANS

The ISUD -plan is a strategic document aiming at giving guidelines for future development of Kisumu. It is made by initiatives from the Kenyan Ministry of Local Governments (MoLG) and the County, with support and funding from AFD. The time frame for the ISUD-plan is 15 years until 2030 (Nodalis Conseil, 2013).

In the ISUD-plan there are some areas identified to have special high value and unique influence on Kisumu's development and therefore prioritised areas to develop. These areas have more detailed descriptions on how they should be developed with planning guidance and development restrictions. One of these areas is the lakefront. It is chosen due to its the strategic location and vast development potential. (Nodalis Conseil, 2014)

The guidelines for the lakefront development are yet rather comprehensive and not so detailed, which creates several question marks. A more detailed plan is required in order to understand what the aim and guidelines actually means. A recurring request and aim is to reconnect the lake with the CBD and improve public access to the lake. The extensively comprehensive plan over the lakefront have several advantageous features, although not so detailed described. The next step is presumably to do more detailed plans for the development of the lakefront.

In the ISUD-plan it is proposed to construct a public park along the shoreline in order to create access for all people to the lake. Since Kisumu lacks planned public spaces this is a necessary element to add. More access to the lake is also suggested by the proposed promenade along the lake and the extended paths from Bank street down all the way to the lake. The Yomo Kenyetta Sports Ground are

proposed to be connected through an avenue. The sports ground is an important node and meeting place that holds a lot of people which therefore are crucial to connect. However there are no proposed paths leading down to the lake from the south part of the city. To only connect the CBD to the lake and leave the southern area out, has the risk to create a network that lacks in coherence and that is problematic to orientate in.

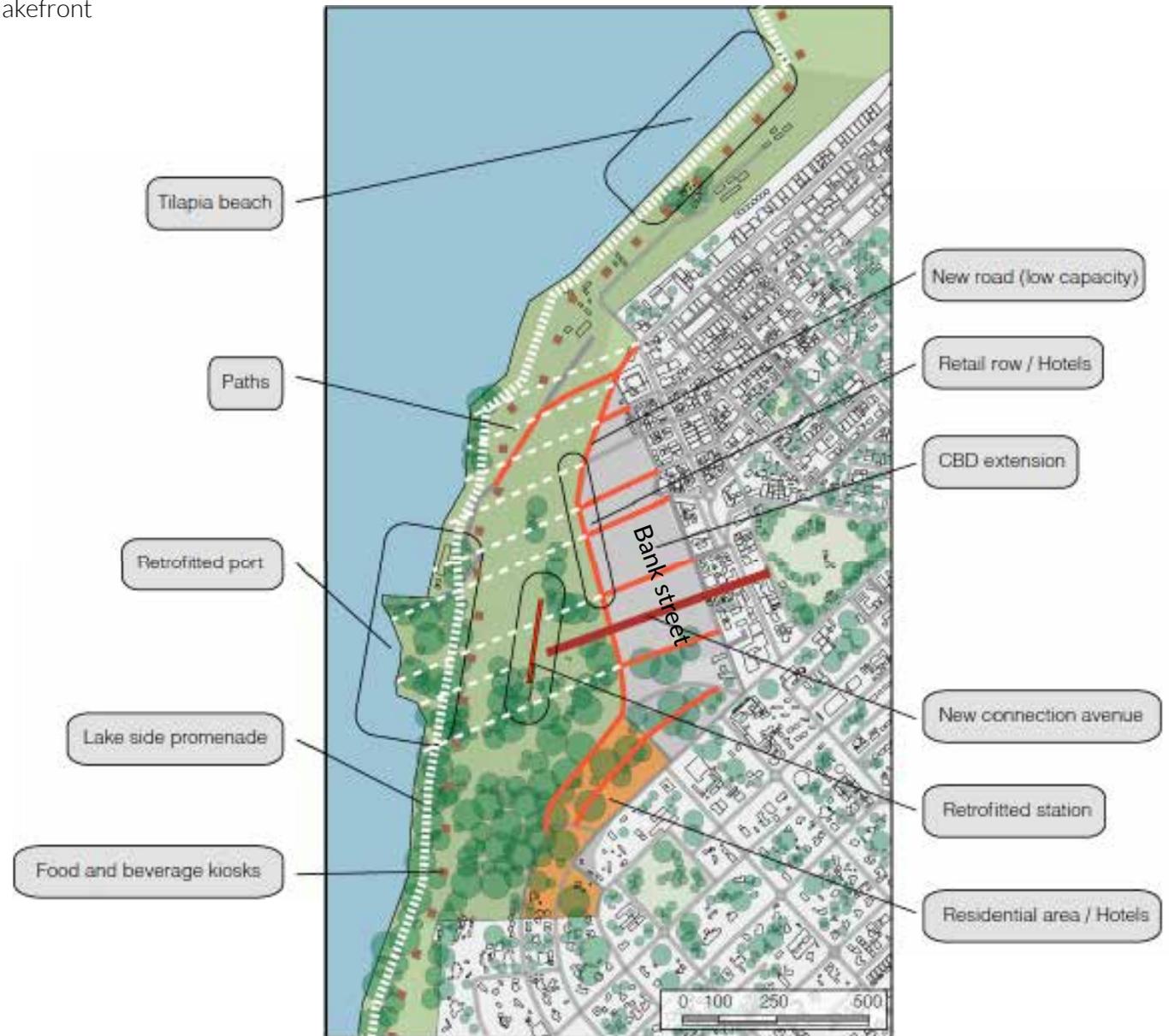
The proposed residential area only includes detached houses and no apartments or more vertical development. A risk of not satisfy the need for housing is more likely with fewer housing opportunities, that detached houses will provide, compared to apartment buildings. Furthermore, considerations of the existing railway buildings that are located where the CBD is proposed to expand are not described. The question is if the detached houses will provide more housing opportunities than the already existing elongated buildings, which includes several households in each building. How is the conditions of the existing buildings, could they be refurbished. Furthermore, a housing area with a mix of apartment buildings and detached houses could provide a more diverse and exciting environment, in terms of both people, architectural expression and streetscapes.

Another question which should be addressed, is how to deal with all existing accommodations, activities and businesses, located at the lakefront. For example, at Luangni Beach, the hotels, carwash and boat tour guides. Existing initiatives and businesses is an asset that provide income possibilities, as well as meeting a need and demand. Therefore it is crucial to consider how it is possible to take advantage of this asset, how initiatives and driving forces can be encouraged and enabled to develop further, in a sustainable way.

A description of the proposed layout and land use of the lakefront development according to the ISUD-plan:

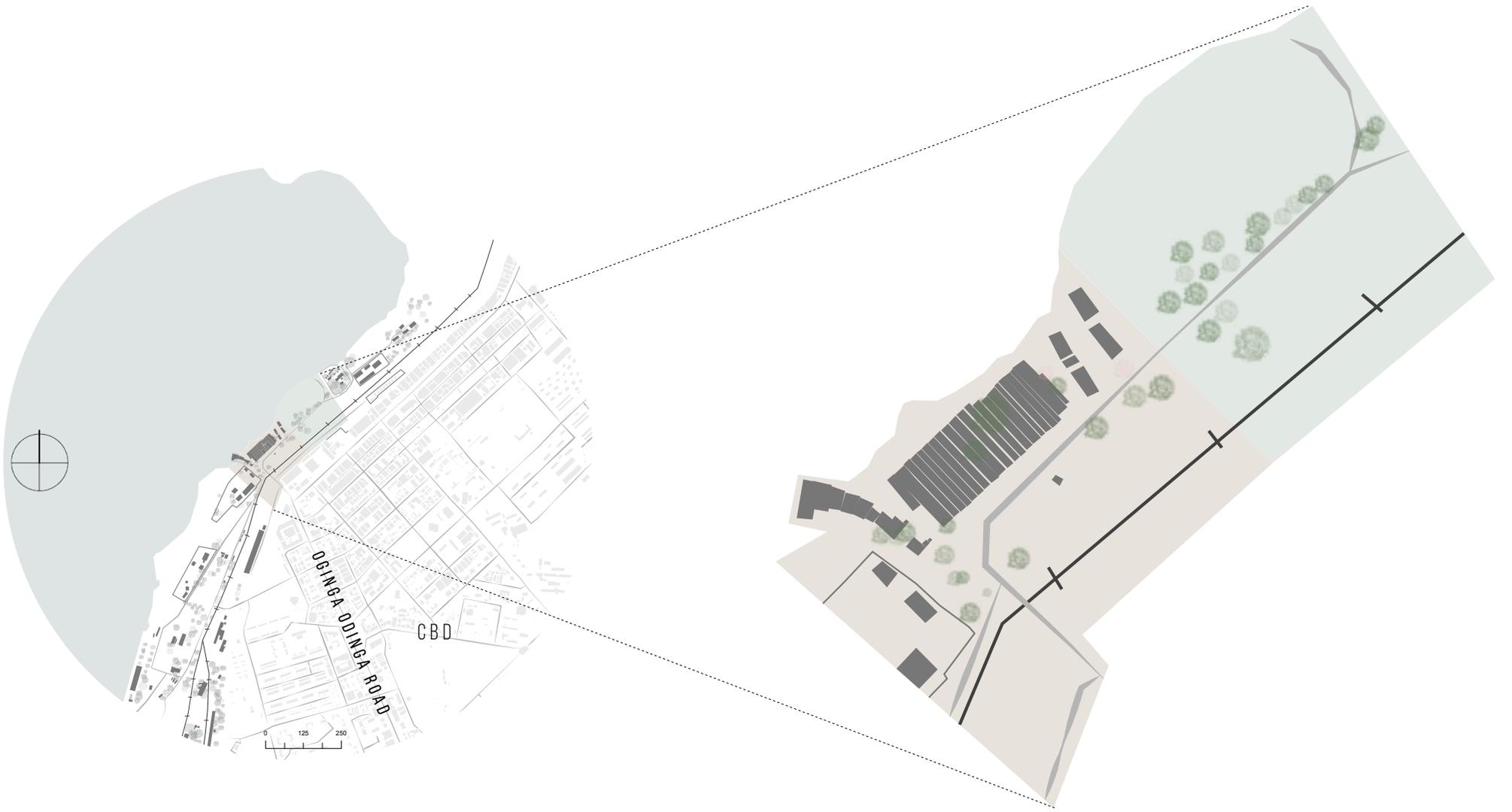
- Extension of the CBD by 15 hectares for a total additional buildable area of 390 400 square meters zoned as mixed use with lake-facing retail row and 8 hectares of residential area (detached houses)
- Creation of a vast lake-side park
- Creation of a new signature urban feature with a grand avenue linking Jomo Kenyatta Sports Ground and the proposed lakefront park
- Creation of strong linkage with extension of the existing street grid to the lake side through elongation of Bank Street up to Obote Road
- Creation of a North South axis from Impala Way to Obote Road
- Further extension of the streets into paths connecting the urban extension to the shoreline
- Creation of a lake side promenade from Impala Park at the southern part of the lakefront to Tilapia Beach, with food and beverage kiosks
- Retrofitting of the station into a culture and leisure center
- Retrofitting of the port into an artisan fishing and boating center with lake side restaurants.

(Nodal Conseil, 2014)





MEET LUANGNI





LUANGNI CONTEXT

Luangni and the cultivation area has a strategic location in direct connection to the CBD through Oginga Odinga road and to the lake. Luangni is located in between the railway- and port area and Tilapia Beach.

The name Luangni means flies in Luo and originates from the initial activity that was situated here, a slaughterhouse. The meat in the slaughter house attracted a lot of flies and hence the name was invented. Hotels in Kisumu means a place where food is served and not an actual hotel with lodging.

Today the area consist of several activities and is bursting with life. The slaughterhouse is not here anymore, instead most land is occupied by hotels. Although, there are several other activities going on here. The structures have popped up one by one gradually, with a lack of restrictions and guidelines on how to develop. This means that the pattern they developed is working as a barrier to the lake and are not advantageous either for the area itself, nor for the city and its connection to the lake.

There are several activities in Luangni that are causing environmental degradation. The educational level and awareness of environmental

impact are low among many Kenyans, which results in a lack of engagement and consideration about the environment. However, it is presumably both the lack of awareness and the lack of ability to afford to operate in a way that is not affecting the environment negatively. These activities are for example the carwash done directly into the lake, the cooking with firewood, as well as deficient solid and liquid waste management.

Luangni is chosen for a more thorough analysis due to the vast opportunities it contains, such as the numerous activities which provide income generating possibilities for many people. The area is also chosen because of the immense challenges it presumably will face, in terms of increased pressure on the environment, which to some extent is caused by existing activities.

Luangni is a place where environmental degradation from humans is obvious. It is a place that has potential to attract a wider range of tourists, which makes it a perfect place to spread knowledge and enlighten about nature. Furthermore, the strategic location implies that there is a vast opportunity to spill over and affect the whole city. It is also chosen due to it is an area where existing activities potential has not yet been examined.

LUANGNI

+ STRENGTHS

- In direct connection to the city core, the CBD
- In connection to the lake, a major asset
- A tourist destination, mostly tourists from Kisumu, Kenya and neighboring countries
- A vivid, dynamic and vibrant character
- Existing activities creates vividness and important income for livelihood
- The greenery and cultivation area provides cool microclimate and biodiversity
- The railway with its historical value and the potential to have a new purpose
- A strong local and Kenyan identity and actors with great motivation and entrepreneurial qualities

WEAKNESSES

- Lack of coherent path network and access for the public to the lake
- Lack of public meeting places, to sit, relax and meet
- Cars are prioritised at the entrance to Luangni, which creates a barrier for sustainable modes of travel, as pedestrians and cyclists
- Heavy traffic at peak times that causes disturbing noise
- During heavy rainfall flooding occurs
- Hotels blocking view and connection to the water
- Car parking blocking entrance to hotels
- Lack of connections to and from site
- Lack of street lights and light sources, creates a feeling of being unsafe, limits opening hours and activity during evening hours
- Lack of collaboration and understanding between different groups of actors, the County and KRC
- Actors lack of ability and possibility to have a stable income all year around
- Hard to attract international tourists, likely because of the somehow unorganised, messy environment together with the obvious environmental degradation taking place
- Invasion of grass and water hyacinth forces boat tour companies to relocate their business seasonally.
- Lack of facilities and permissions for actors to develop their businesses
- A lack of mixed use and variation. Hotels with the same selections are overrepresented. Too much supply compared to demand
- Environmental degradation and unsustainable use of water, energy and waste. Non-existent recycling, use of renewable energy and reuse or catchment of water. Pollution from carwash directly into the lake.



The hotels are situated directly at the lakefront. They are placed close together in a row

Right outside of the site boundary is a well maintained restaurant located. It is fenced by a wall.



There are four toilets close to the hotels, where you have to pay a fee to use.

The railway tracks goes all the way through Luangni but are not in operation. The tracks are currently used as a footpath.



Next to the hotels are some small shops selling M-pesa and clothes.

Several industrial activities are surrounding the site. Many of them are fenced.





Luangni today

Luangni can be divided in two areas, the cultivation area to the north and the hotel area to the south. The hotel area are bursting with life with a variety of activities. The cultivation area in contrast are rather empty with just a few people around. Below are all activities and use of the land described.

0 50 100

- Site boundary
- ◆ Hotels
- ◆ Industrial activity
- ◆ Restaurant
- ◆ Toilets
- ◆ Small shops/MPESA/Clothes
- ◆ Cultivation/Aquatic plants/Greenery
- ◆ Firewood cutting
- ◆ Parking space
- ◆ Waste
- ◆ Public meeting places
- ◆ Carwash
- ◆ Boat tour docking



There is no planned parking space but the common place to park is at the road next to the entrance of the hotels



When some visitors are eating at the hotel they leave their car to be washed. The washing takes place at two spots, nearby the hotels, directly into the lake.



The boats used for boat tours on Lake Victoria are departing from here.



The garbage is collected in a pile at the back of the toilets, due to the lack of a proper waste disposal system.



Firewood used for the hotels to cook food is cut next to the hotels.



People from the villages are framing in the area, north of the hotels. The spaces in between are rampant and some papyrus are grown here.



There are no planned public meeting places, but there are some that just have popped up. Usually under a tree providing shadow.



Luangni today

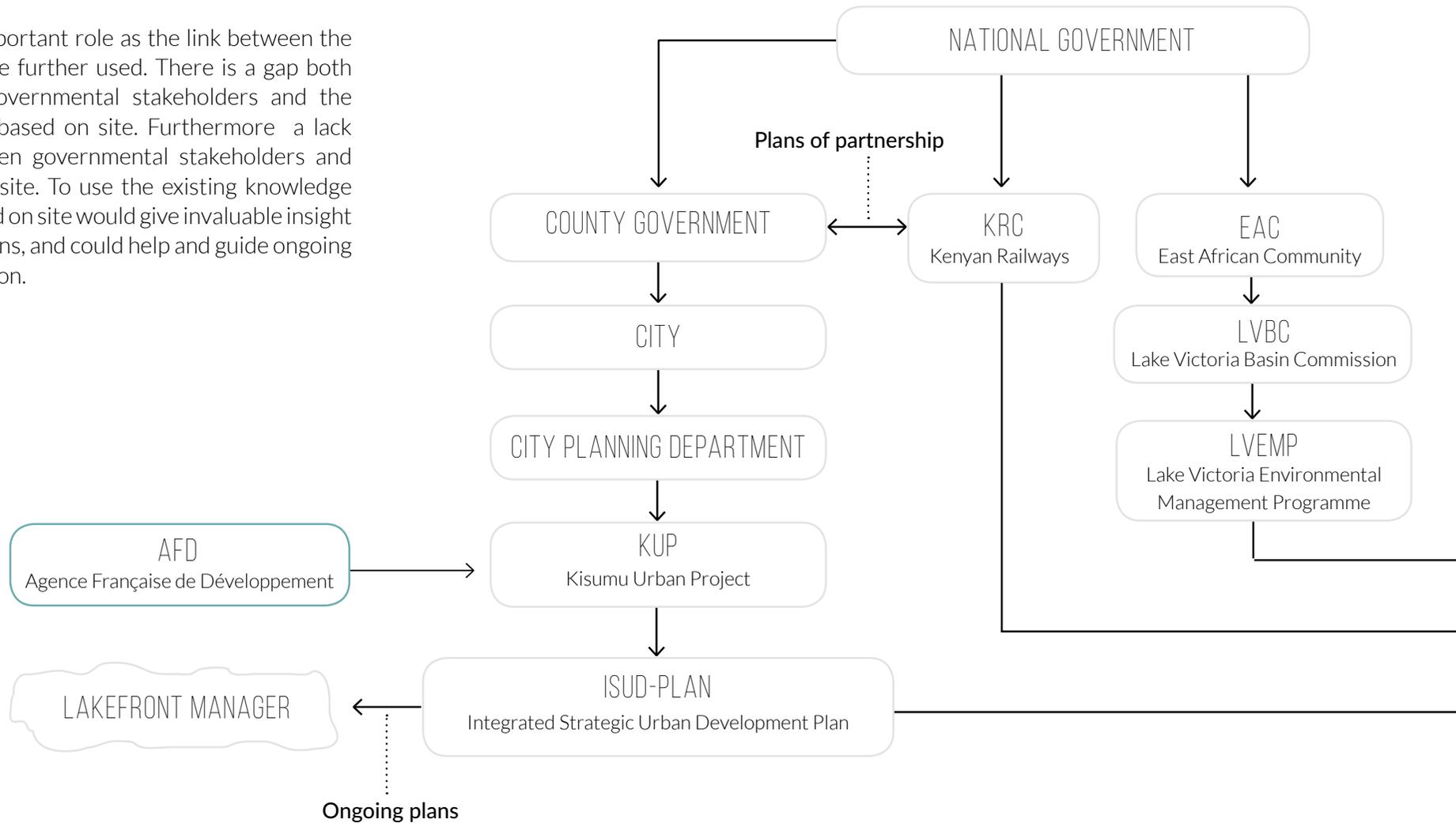


- Site boundary
- Hotels
- Industrial activity
- Restaurant
- Toilets
- Small shops/MPESA/Clothes
- Cultivation/Aquatic plants/Greenery
- Firewood cutting
- Parking space
- Waste
- Public meeting places
- Carwash
- Boat tour docking

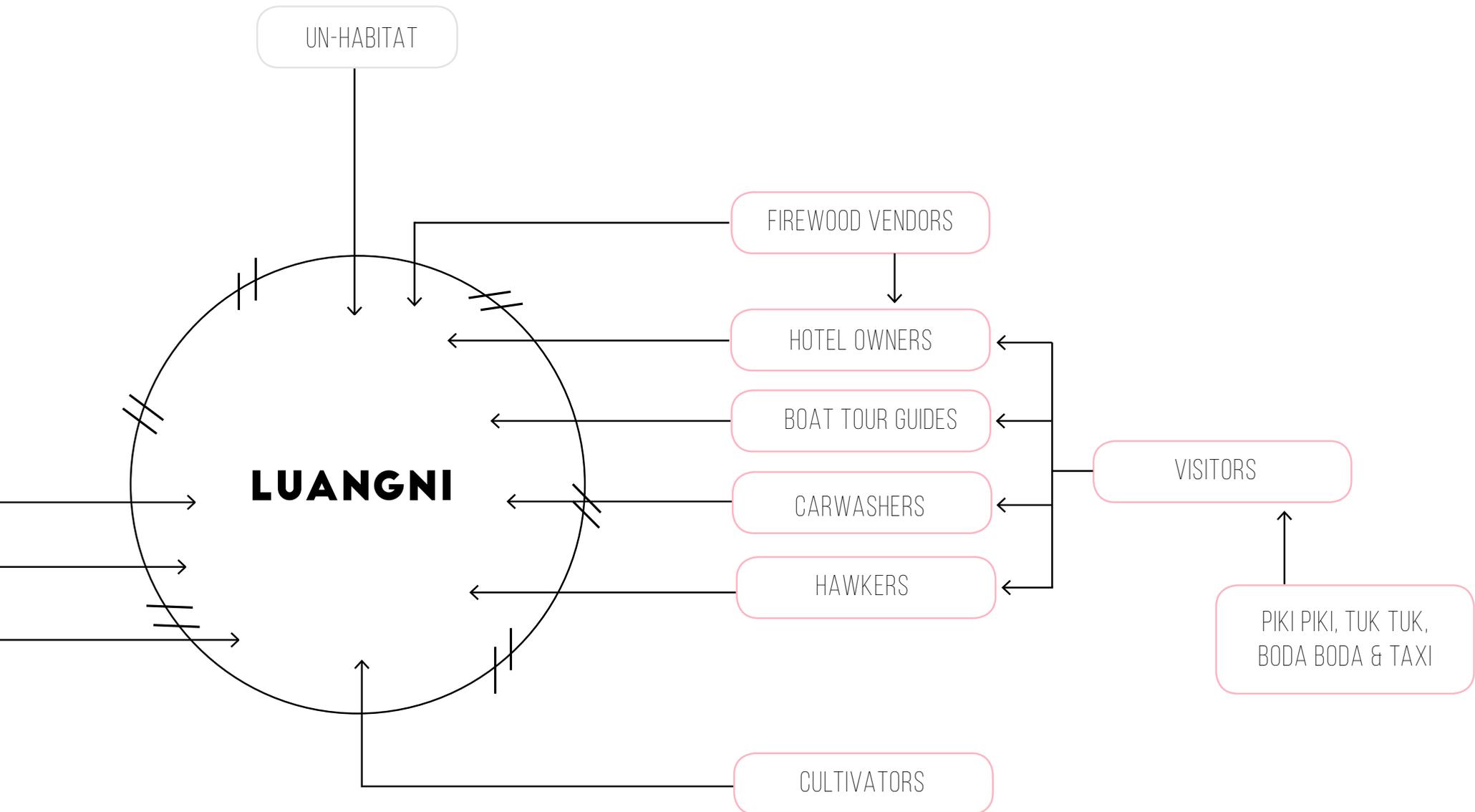
MAIN STAKEHOLDERS

There are numerous stakeholders and initiatives affecting the development of Luangni, which is described by the diagram. Although there are some ongoing thoughts of having more collaboration between different stakeholders it has not yet been carried out.

UN-habitat plays an important role as the link between the stakeholders and can be further used. There is a gap both within the different governmental stakeholders and the different stakeholders based on site. Furthermore a lack of collaboration between governmental stakeholders and stakeholders based on site. To use the existing knowledge from stakeholders based on site would give invaluable insight on the site's preconditions, and could help and guide ongoing plans in the right direction.



- Doing, on site
- Planning
- Financing



STAKEHOLDERS ON SITE

The following pages include an introduction to the main stakeholders based at Luangni, the hawkers, boat tour guides, carwashers and hoteliers. A description of what they do there, what their challenges and visions are.

Over time, and with increased demand, several different initiatives have developed and created essential income possibilities. These initiatives are crucial to use and support in order to make it possible for them to develop, which will create further job- and incomes possibilities for livelihood.

Groups are formed within each field of business. These groups have meetings regularly. However, there is still a lack of collaboration and understanding between the different groups of stakeholders on site. There is also somehow a mentality of competition between stakeholders, instead of a will to work together towards the same goal. To strive to complement each other and take advantage of each others' qualities.

“Our vision is to have a place to be, an office where we could sell our items and store them.”

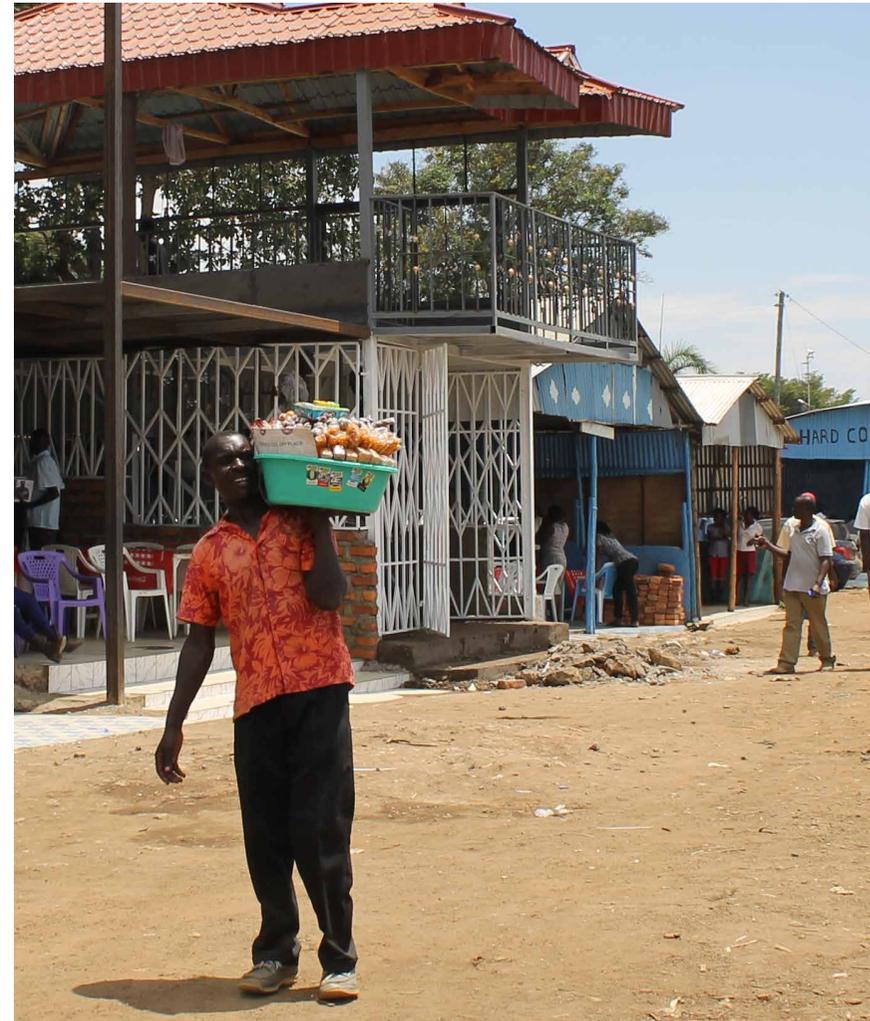
(Hawker, 2015)

HAWKERS

The hawkers in Luangni sell various kinds of items as CDs, crafts, accessories and hardware etc. Each hawker has a specific focus on one kind of items, e.g. one may sell only hats.

The Hawkers have formed a group with currently 80 members, where 35 are active selling items. They have meetings every week to discuss their businesses, different challenges and how to deal with them. Since the group was formed several issues has been dealt with successfully.

The income varies throughout the year, sometimes the business is going well but sometimes it is hard to earn enough money for livelihood.



“Our wish is to have a more stable income so we can work with this all year around. We would like to have a jetty where we can dock the boats and an office to handle administrative tasks.”

(Boat tour guide, 2015)

BOAT TOUR GUIDES

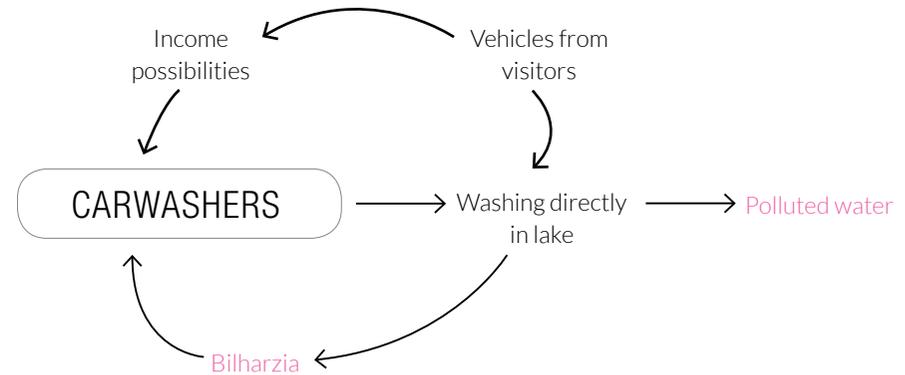
Boat tours exploring the habitat of Lake Victoria are based in Luangni. There are seven boats all owned by individuals. The boat tour guides have also formed a group that regularly have meetings to discuss their businesses. Currently they are 25 members. There is only one person who can guide about the environment of Lake Victoria, the others are not educated in this area. The most popular tour is to go and look for hippos in the lake.

Their costumers are mostly locals and especially school classes and many tourists comes from the central parts of Kenya. Seasonally water hyacinths and grass are floating in on the shore, which forces them to move their businesses to other shores where they have to pay a fee to operate. These periods together with low seasons makes the business and income for livelihood hard, therefore all of them have alternative income sources.



"I had some troubles at home and could not find a job so I started to live on the streets. I got the opportunity to start working with the carwash and now I even have a home and a family that I can provide for. If there was a way of doing carwash without polluting the lake and if I still could provide for my family I would be more than happy to do that."

(Carwasher, 2015)



CARWASHERS

While some visitors eat at the hotels they leave their vehicle to the carwashers to get it cleaned. The carwash is done directly into the lake without water treatment and is causing pollution. The carwashers are sometimes also getting a severe disease called bilharzia, caused by parasites in the water.

Although, the carwash is polluting the lake and may create an unpleasant appearance in this natural environment, there is still a high demand for carwash here, and in turn it creates important income possibilities. In regard to the high unemployment rate and poverty in Kisumu, existing income bringing activities and opportunities should preferably be encouraged in order to deal with unemployment and poverty. However, it is still crucial to bring this activity the possibility to operate in a sustainable way which does not pollute the lake.





HOTELIERS

The hotels represent the largest part of the activities in Luangni. There are around 30 hotels in Luangni. All hotels serve the well-known fried Tilapia fish with ugali and sukuma wiki. One of the hotels also serves meat which attracts more local people from Kisumu. Eating Tilapia fish in Luangni is a well-known and appreciated tourist attraction for many Kenyans.

The hoteliers have formed a group and have meetings once a week to discuss how to deal with difficulties. The hotel owners are mostly in their upper age, although some younger persons are managing the hotels which they rent from the owners. The fish is currently being imported from Uganda because the Tilapia fish found in Kisumu is nowadays smaller and less flavourful than the Ugandan fish. The pollution in the lake has caused a decreased fish stock and the overfishing prevents the fish to grow at its full size before it is caught.

To prepare the fish firewood is used, which is not a sustainable or healthy product to use. The overuse of firewood in Kisumu causes erosions and

flooding. There is no collection of waste at Luangni which complicates the waste disposal. Organic waste is collected in a pile at the back of the toilets and eaten by animals, while the other waste is burned. There are only four hotels that have electricity and blackouts are common. The lack of electricity is limiting opening hours which means that most hotels close at around seven. It also affects the risk of break-ins.

With around 30 hotels all serving the same dish there is a high supply and not enough demand. The structures are poor, of semi-permanent character with metal sheets as roof and walls, some brick walls and wooden beams. The water system and the water points where the hotels take water from is not reliable and are frequently not in function.



“I want to develop my business and be able to offer accommodation for visitors“

“It is hard to attract international tourists. I think it is because the facilities and structures are poor and the carwash in the lake makes a bad appearance“

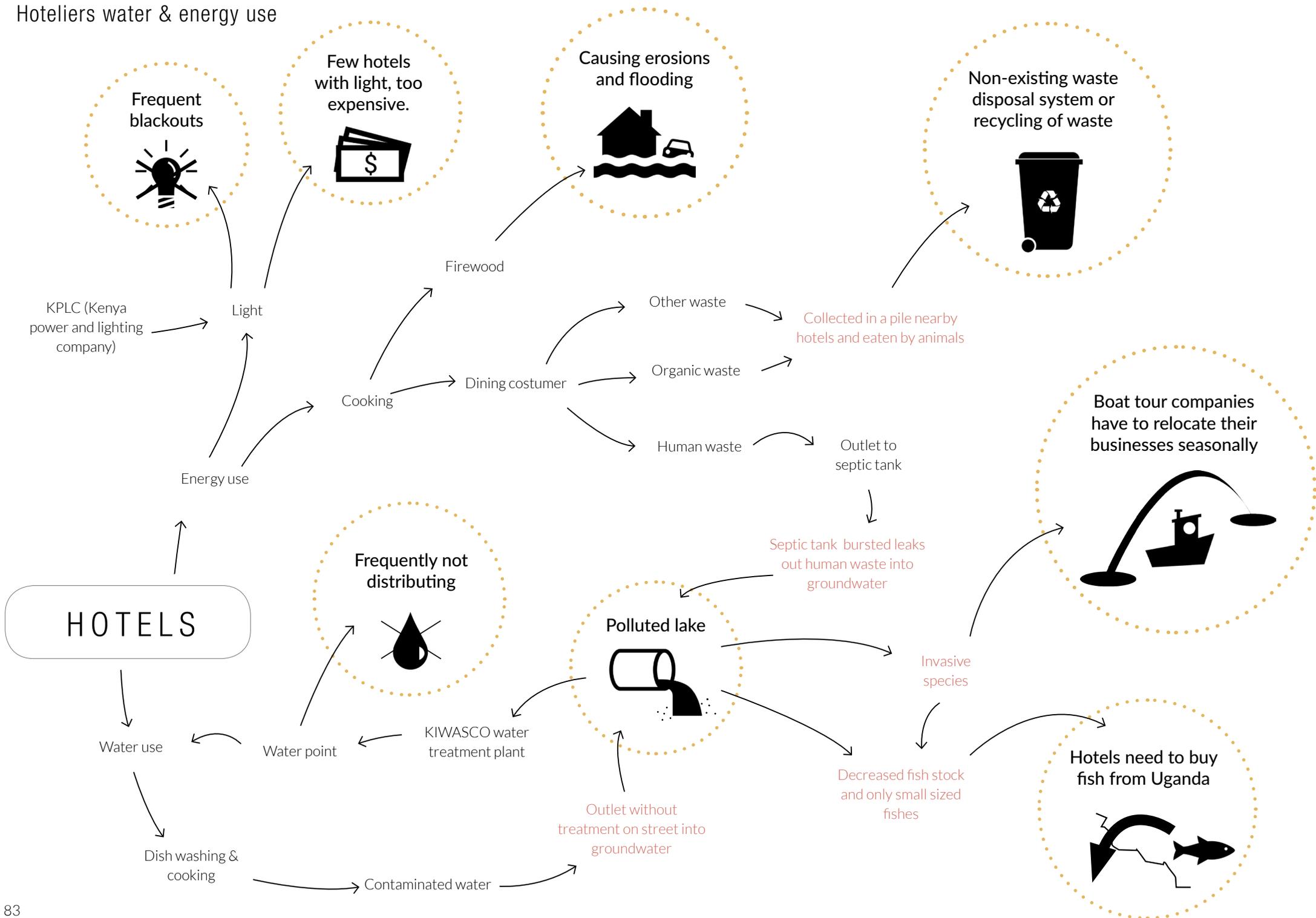
“I could not find a job so when I heard from a friend about the hotels in Luangni I decided to go for that. I saved money from farming sugar canes until I could buy my own hotel.“

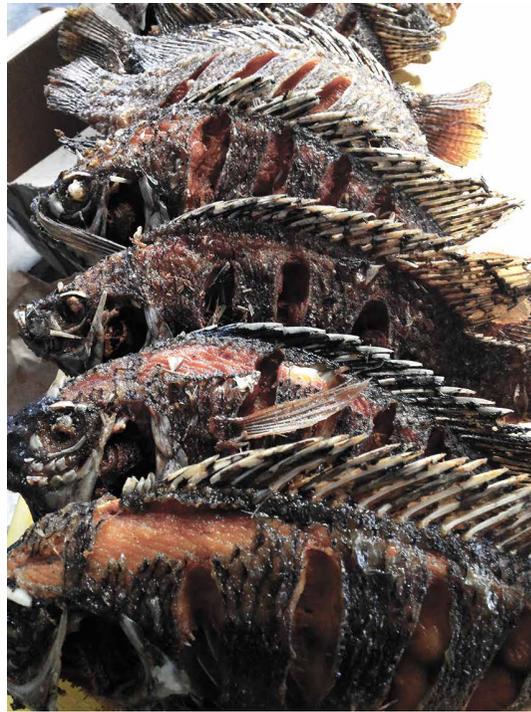
“My wish is that the structures get permanent so it feels safe to invest in your business.“

“I would like to have longer opening hours and I hope that it will feel safe someday for people to walk down here at night.“

(Hoteliers, 2015)

Hoteliers water & energy use





MOVEMENT & ACCESS

The existing movements are of various types, with cars, trucks, tuk tuk, motorbikes, bicycles and walking. There are several physical barriers that limits access, especially to the lake, with interrupted pathways and blocked views. There is a lack of a coherent network that restricts and guides motor vehicle movement to areas where it is not disturbing. Furthermore, motor vehicles limits access for sustainable modes of travel, such as pedestrians and cyclists.



Mostly pedestrian movement on earth and sand paths.



Various modes of travel. However, motor vehicles taking over the space and creates a barrier that limits access for pedestrians and cyclists, as well as making disturbing noise.



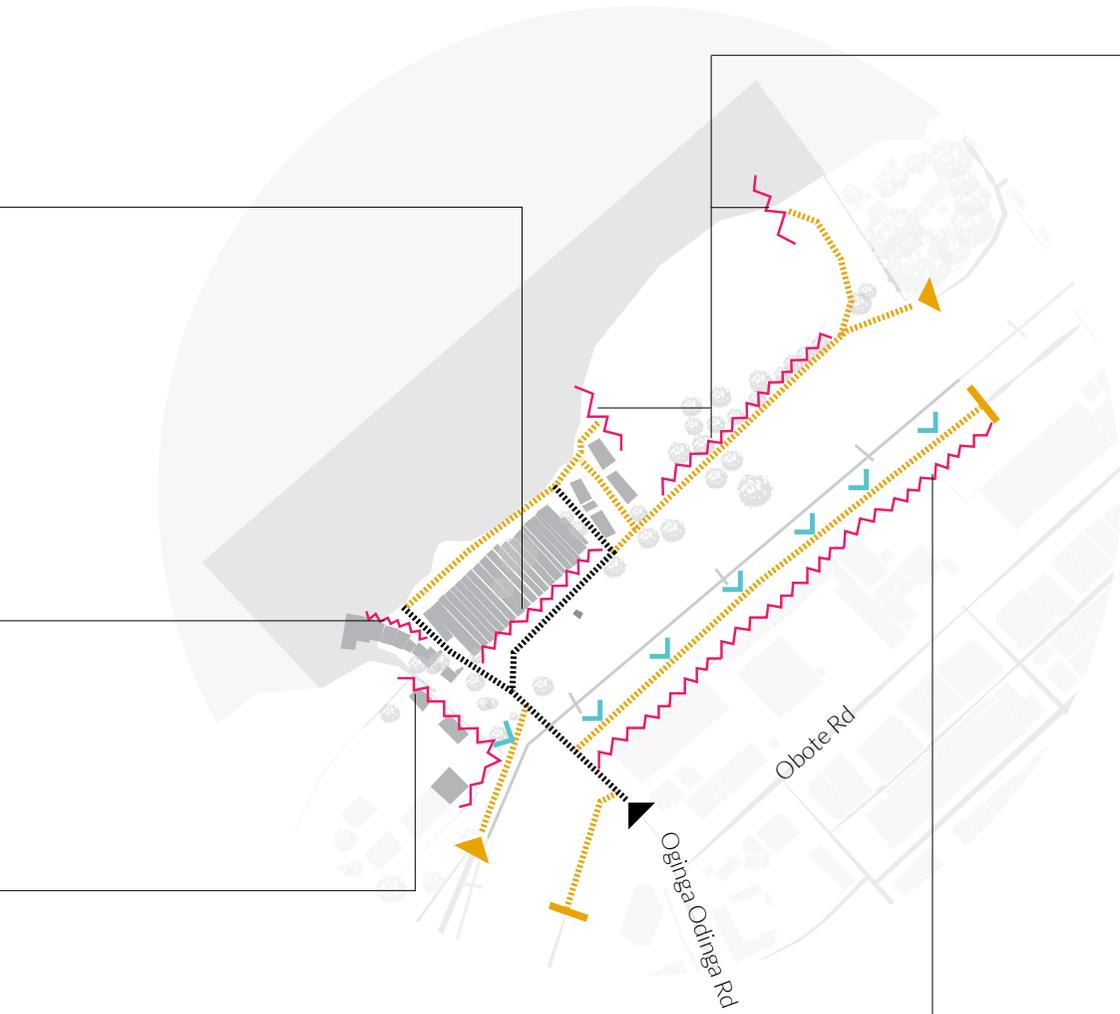
Vehicles parking at the entrance of the hotels, blocks and hides the entrances.



Hotels creates a barrier and interrupts the path along the lake.



Fenced enclosed area blocking the view over the lake and creates a barrier for accessing the lake.



-  motor vehicles/pedestrians/cyclists
-  pedestrians/cyclists
-  entrances
-  ended path shortly after
-  physical barriers
-  visual access



The cultivation area lacks paths down to and along the lake, which creates a barrier to access the lake.



Visual access to water and hotels from the railway tracks before the slope down to Luangni



There is no passages down to the lake along Obote Road, which creates a barrier with only one entrance to Luangni. This means that in order to reach Luangni's northern part it is necessary to make a vast detour and walk down to Oginga Odinga Road.

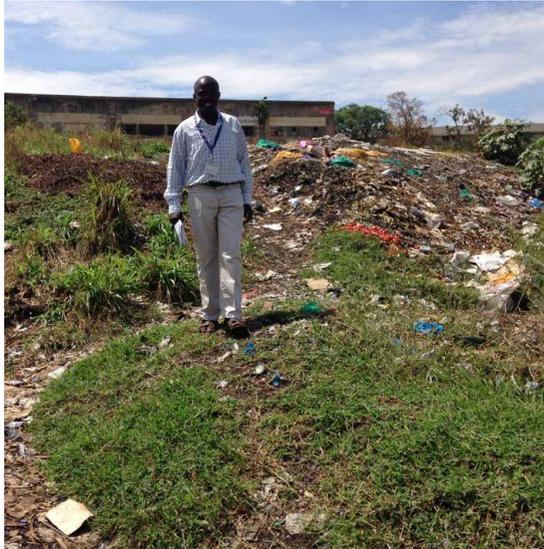
MENTAL BARRIERS

Luangni attracts mostly locals and national tourists, and a minor amount of international tourists. There are several things in Luangni that can be seen to work as mental barriers for some visitors. A considerable amount of these barriers is also causing environmental degradation. The most crucial ones, which is connected to urban design, is explained in the following section.

CARWASH

The carwash directly into the lake reveals the obvious environmental degradation that is going on here. This can be seen as one of the reasons that some visitors do not come here. The carwash is somehow blocking the scenic view over the lake. With loud music playing from the cars it does not give a sense of calmness that some visitors may appreciate. Luangni Beach are also a place where people like to go for a swim, which means that they have to swim right next to where polluted water flows from the carwash. However, the carwash still provides job opportunities and a source of income for livelihood.





UNSTRUCTURED & MESSY

Luangni is an area that has developed gradually over time, without restrictions, which could be one reason for developing to a rather unstructured, noisy and messy area. However, it has also developed to a dynamic, exciting and important meeting place, with a lot of people and vividness.

There are several reasons for this rather messy and unstructured sense of place. For one, there is no proper garbage disposal system. Garbage is collected in a pile nearby the hotels which makes the

site appear messy and unclean. The grass area by the entrance of Luangni, on the middle picture, works as a place for garbage disposal and firewood cutting. This contributes to the feeling of the site as being messy and noisy. The traffic with cars, tuk tuks, trucks and motorbikes creates a high level of disturbing noise. Further, takes over most of the street and creates a mental barrier for pedestrians. However, the dynamic and vivid character here is also a big asset which should be utilised. To not extinguish this character by restricting and organising to a full extent.

SAFETY

There is a lack of street lights in the whole area. There is only one light source at the entrance to Luangni and only a few hotels have electricity and light. There are also areas where you are at risk of being robbed, one is at the entrance nearby the warehouses and the other in the farming area. Both these aspects creates a feeling of being unsafe and prevents people to visit the area when it is dark.



The lack of people and light and the risk of being robbed at the farming area prevents people to go here.

“Before we employed a guard to be here at night there were issues with people stealing sodas and fish during dark hours. At 7 to 8 pm it is risky to come here, people stay in the drainage and outside of the warehouses and sometimes sneaks on people going down to Luangni to rob them.”

(Hotel owner, 2015)





SUMMARY

The lakefront has substantial potential to become a place that inhabitants of Kisumu can enjoy together with visitors. With its scenic setting at the lake and strategic position in connection to the CBD, it is a unique and most valuable place. However, there are problems that prevents development here, as for example lack or collaboration between stakeholders and land ownership disagreements.

The lakefront area today are substantially underutilised. There is a lack of connections within and to the lakefront and the large scaled fenced areas creates a vast barrier between the city, its people and the lake.

In contrast to other parts of the lakefront, Luangni is a vibrant and bustling place with a wide range of activities and stakeholders. The main stakeholders being hawkers, boat tour guides, carwashers and hoteliers. Several of the activities at Luangni causes environmental degradation, as pollution in the lake, firewood use and the lack of sustainable waste management. The environmental effects from human impact are most evident here, with the hyacinth invading the shores, the lack of fish stock and flooding.

There is a lack of access within and to the area and the car traffic has taken over the entrance and road down to Luangni. There are several mental barriers as safety issues with a lack of light throughout the area, the carwash directly into the lake and the unstructured and messy character of the place. However, Luangni possess vast opportunities, with an exciting and dynamic character and people with high ambitions and goals.





4

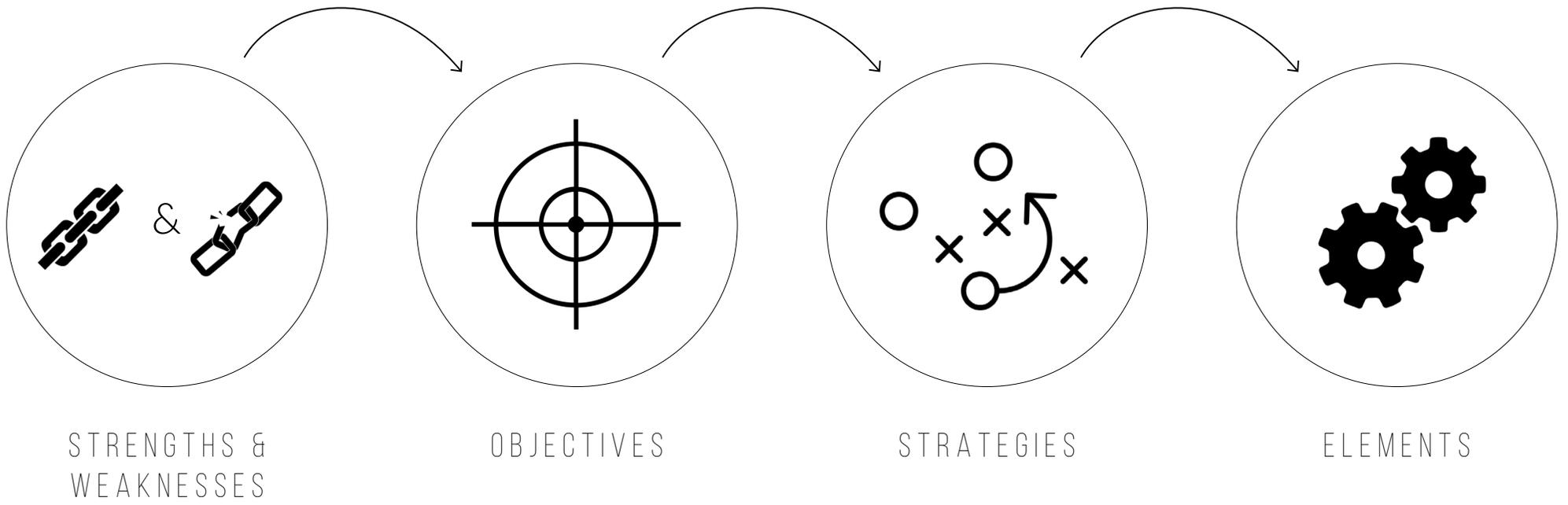
DESIGN PROPOSAL

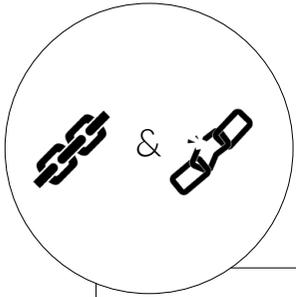
This chapter guides through the proposal for Luangni Beach. The first part is a description of the method used for the design, followed by strengths and weaknesses connected to the objectives and strategies and how they are interlinked. In the following part the strategies are connected to the different elements in the proposal illustrated in a master plan with associated sections. In the end the proposed elements are described more thorough.

Followed by the proposal and the very end of the booklet is a section with concluding remarks and reflections.

DESIGN METHOD

The design method has been made in four steps and is based on the analysis. It begins with a look back at the strengths and weaknesses, which the more comprehensive objectives and strategies are developed from. The strategies has then framed the proposed master plan and design for Luangni, through a process of sketching where different features and elements been tested.





STRENGTHS & WEAKNESSES

-
- Lack of coherent paths and access for the public to the shoreline
- Lack of public meeting places, to sit, relax and meet
- Hotels blocking view and connection to the water
- Car parking blocking entrance to hotels
- Lack of connections to and from site
- Lack of street lights and light sources creates a feeling of being unsafe, limits opening hours and activity in evening hours
- +
- In direct connection to the city core (CBD)
- In connection to the water, a major asset

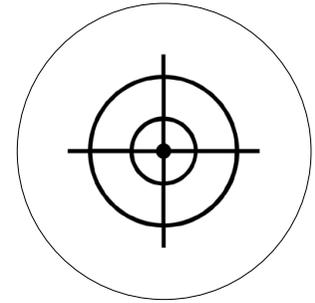
-
- Lack of collaboration and understanding between different stakeholder groups, the County and KRC
- Lack of facilities and permissions for actors and initiatives to develop their businesses
- Bribery prevents new ideas to get realised and hamper development for already existing entrepreneurs.

-
- Heavy traffic at peak times that causes disturbing noise
- Seasonal heavy rainfalls causes flooding and erosions
- Invasion of grass and water hyacinth force boat tour companies to relocate their business seasonally.
- Environmental degradation and unsustainable use of water, energy and waste. Non-existent recycling, use of renewable energy and reuse or catchment of water. Pollution from carwash directly into the lake.

- +
- A tourist destination, mostly tourists from Kisumu, Kenya and neighboring countries
- A vivid and vibrant character
- Existing activities creates vividness and income for livelihood
- The railway with its historical value and the potential for it to have a new purpose
- The greenery, rampant and cultivation area provides cool microclimate and biodiversity
- A strong local and Kenyan identity and some actors with driving and entrepreneur spirits

-
- Actors lack of ability and possibility to have a stable income all year around
- Hard to attract international tourists, likely because of the unorganised, somehow messy environment and because of the obvious environmental degradation that occurs
- Invasion of grass and water hyacinth force boat tour companies to relocate their business seasonally.
- Lack of facilities and permissions for actors to develop their businesses
- A lack of mixed use and variation. Hotels with the same selections are overrepresented and there is not sufficient demand for it

OBJECTIVES



To enable for a structure that supports and enhances **collaboration** and **coexistence** between actors



To strengthen the **connection** between people and **nature** and encourage to an environmentally friendly and sustainable lifestyle

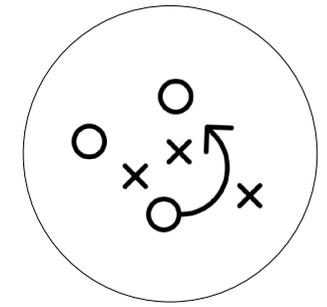


To enhance public realm and access, break the sense of exclusiveness, feeling of insecurity and **reconnect** the city and its people with the lake



To use and enhance **existing** qualities, initiatives and activities.

STRATEGIES



Introduce new facilities, functions and systems to **support for diversity** and attract a wider range of visitors and customers.



Create more facilities to support and enable **sustainable development** of existing activities



Create a **coherent network of paths** for sustainable modes of travel by increasing the amount of connection within, to and from the area.



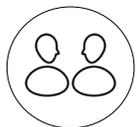
Provide space for various **actors to collaborate** and work together towards the same goal through meetings and workshops.



Display and enlighten about the nature and natural cycles by introducing new elements that provides knowledge, incitement and **encourage for sustainable behaviour**



Provide space for training and capacity building to develop **entrepreneurship and sustainable sources of income** for actors and excluded people.



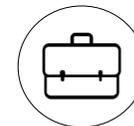
Improve existing meeting places by small-scale interventions that provides ability to sit down, rest, meet and talk.



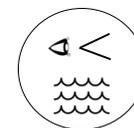
Increase connection and **access to the lake** for the public by a coherent network of paths, meeting places and by letting in and meeting the water.



Increase the number of meeting places by adding new elements that will catch interest, gather people and at the same time raise awareness of the environment



Enable for **more job opportunities** by introducing various functions and activities that together can complement and lift each other



Utilise existing qualities by introducing new facilities, functions and meeting places



Create a **closed loop system** within the area with sustainable management of water, waste and energy through reuse and recycle.

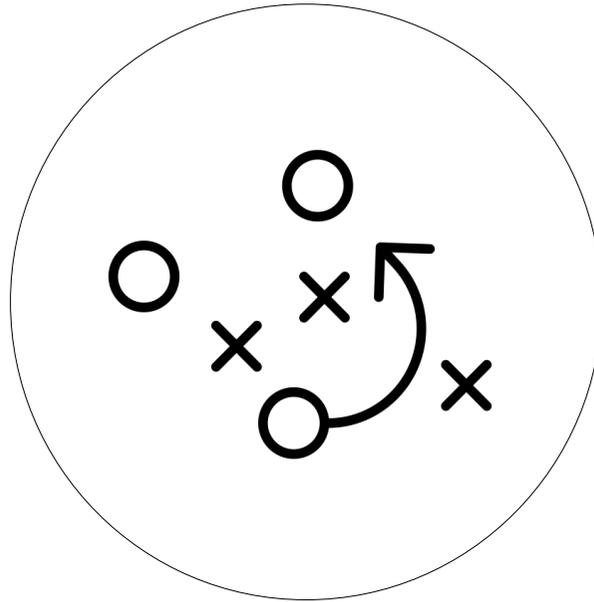


Make **priority for sustainable modes of travel** by street design and relocation of functions and facilities for vehicles

STRATEGIES

OBJECTIVES

													
				✓						✓		✓	
		✓	✓		✓	✓		✓	✓			✓	✓
	✓		✓		✓	✓	✓	✓	✓		✓	✓	✓
	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	



STRATEGIES

In the following part the strategies are connected and displayed in the master plan and design for Luangni.

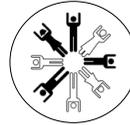
MASTER PLAN

The aim of the master plan over Luangni is to make a place which feels welcoming for all people, both international tourists, local tourists and resident of Kisumu. To create a green oasis which is bursting with life and diversity.

The master plan does not consist of obvious solutions, instead it should be seen as a first step and as strategies for a sustainable development for Luangni. It is a proposal which needs to be further investigated before implementation. The aim with the master plan is that it should be carried out in stages, where proposed changes are made gradually, step by step, in collaboration with all actors involved.

The strategies from the previous part are here connected to different elements in the master plan.

diversity



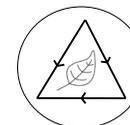
collaboration



job opportunities



closed loop



use existing qualities



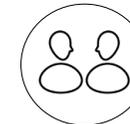
sustainable behaviour



sustainable transport



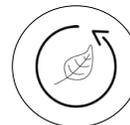
improve meeting places



sustainable entrepreneurship



sustainable development



coherent paths

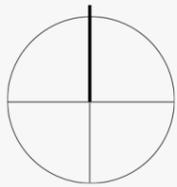


accessible lake



increase meeting places





WETLAND WITH LODGING HUTS



PUBLIC PARK



ACTIVITY AREA



JETTY AND BOARDWALK



HOTELS



COMMUNITY AND ENTREPRENEURSHIP CENTER



RAILWAY MARKET AND DRAISINES



PARKING



CARWASH

A showers & toilets

B hotels

C recycling station & storage

livestock

cultivation

Beach

shops

hut pavilions

lou hut lodging

skyview towers

activity area/playscapes

wet pond

rain garden

0 50 100 (m)

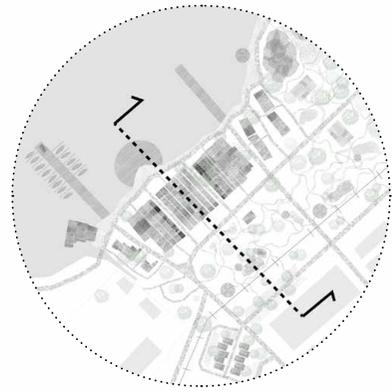
WATER, GREENERY AND COMMUNITY

The section through the whole area from northwest to southeast displays some of the proposed elements. The jetty and boardwalk enhances connection to the lake, the extended greenery with the park and public features, the calmness with less traffic, the center where ideas are created and where the community spirit can flourish, makes Luangni a welcoming and attractive place to be and visit.

COMMUNITY AND ENTREPRENEURSHIP CENTER

JETTY AND BOARDWALK

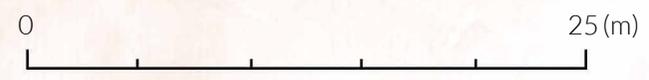


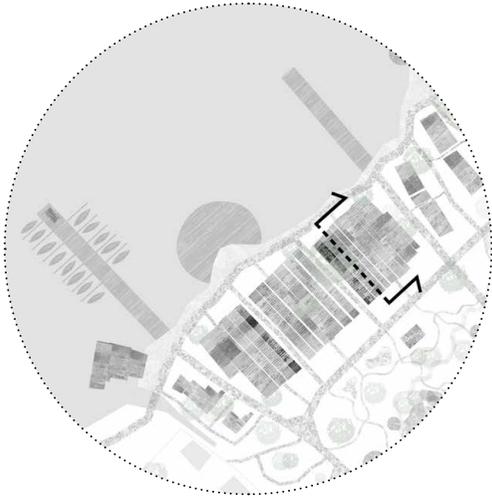


RAILWAY MARKET AND DRAISINES

PUBLIC PARK, BIOSWALES, RAIN GARDENS
AND WET PONDS

PARKING FOR VEHICLES
BEFORE ENTERING





HOTELS

The hotels have longer opening hours with light provided through renewable sustainable sources, which will enhance safety and make it possible and inviting for people to visit Luangni after nightfalls.

The hotels are framed around greenery which provides a pleasant micro climate for meeting places, where tourists and locals to gather. Improved facilities and an extended variety of options will attract a wider crowd of visitors.





0

10 (m)

WATER, NATURE AND ACTIVITIES

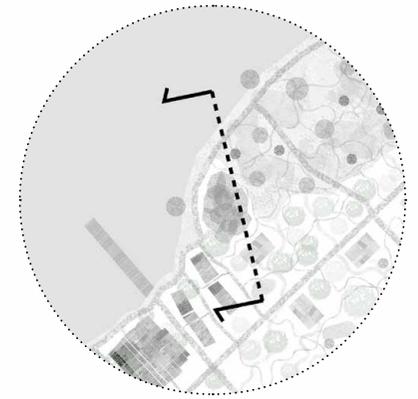
The section displays some of the proposed elements at the northern part next to the hotels. The aim is to take advantage of existing wetland character and expand that feature over the water through a public path and a wetland that will provide an experience on water where one can be close to nature, the lake and its habitat. The activity area provides life and movement with a view over the lake and the park where livestock and cultivation gives an authentic experience of how the food is made for the hotels whilst creating a closer relationship to nature.

ACTIVITY AREA

PUBLIC PARK WITH LIVESTOCK
AND CULTIVATION

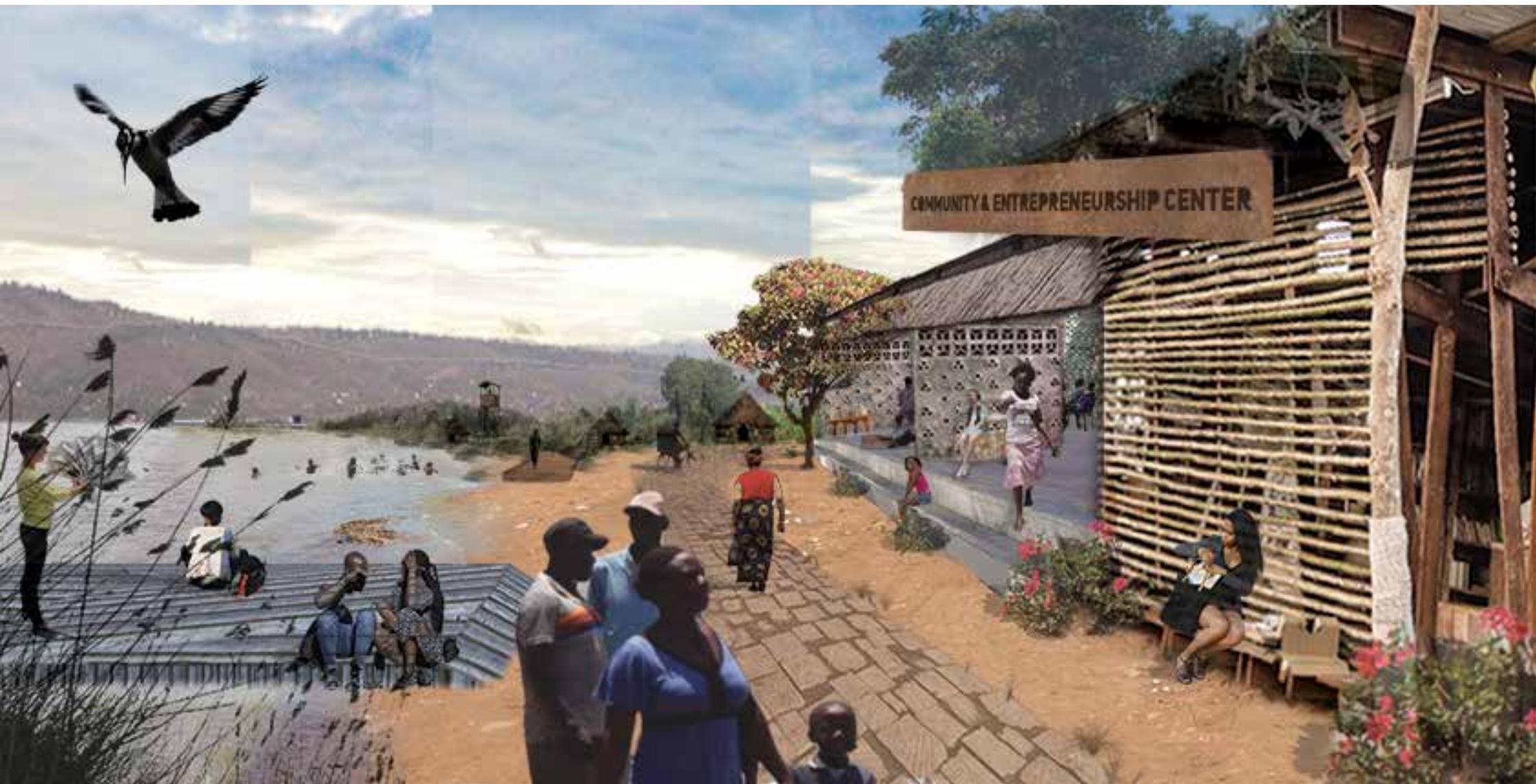


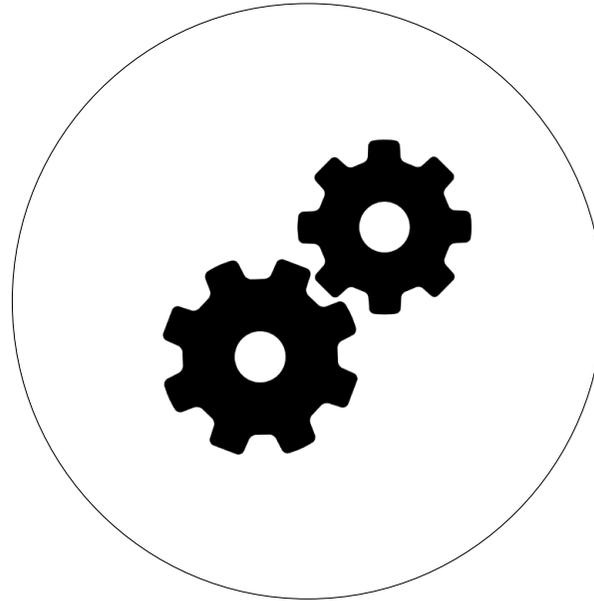
0 25 (m)



WETLAND WITH LODGING HUTS

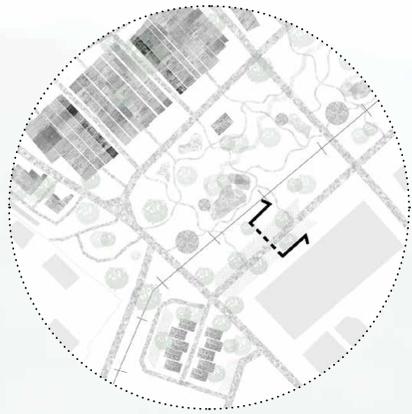






ELEMENTS

Following section will give a closer view on proposed elements.



Parking space combined with trees for various modes of travel



coherent paths



sustainable transport



PARKING FOR VEHICLES BEFORE ENTERING

The proposed parking for vehicles before the slope to Luangni will create a calmer and more pleasant place to be and visit. It will increase access and connection within and to Luangni for sustainable modes of travel. Create a more pleasant environment for pedestrians and cyclists and decrease disturbing noise and smell from vehicles. It will furthermore decrease CO² emissions and enhance use of environmental friendly and sustainable modes of travel.

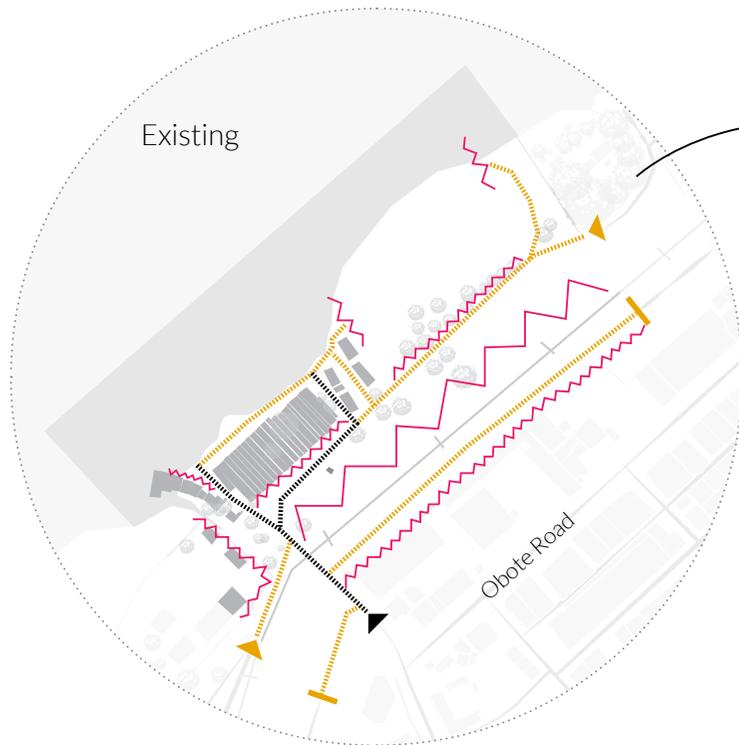
Safety

Increase streetlights throughout the area to enhance the feeling of being safe and in turn the possibility of a place which is vibrant also in the evening. Display and use renewable sources for energy, such as solar cells.



Access

Break barriers that prevent access to the lake, and create a coherent network of paths for sustainable modes of travel throughout the area. Increased amount of access points from various directions are proposed to connect Luangni in all directions. Two more paths from Obote Road and the CBD, are proposed, all the way down to the lake, where it connects to a coherent path along the water.



-  barriers
-  pedestrian/cycle/car
-  entrance
-  lack in connection
-  barrier

-  pedestrian
-  pedestrian/cycle
-  car/pedestrian/cycle
-  entrance



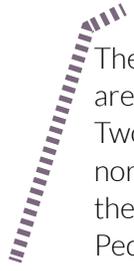
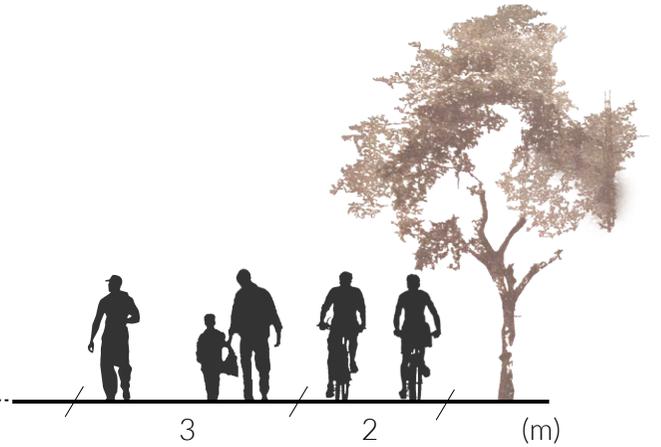
The proposal includes organically shaped pedestrian paths, which meander through the park and wetland. Openings between the hotels with pedestrian paths towards the water are suggested, in order to increase connection and visual sight to the water.



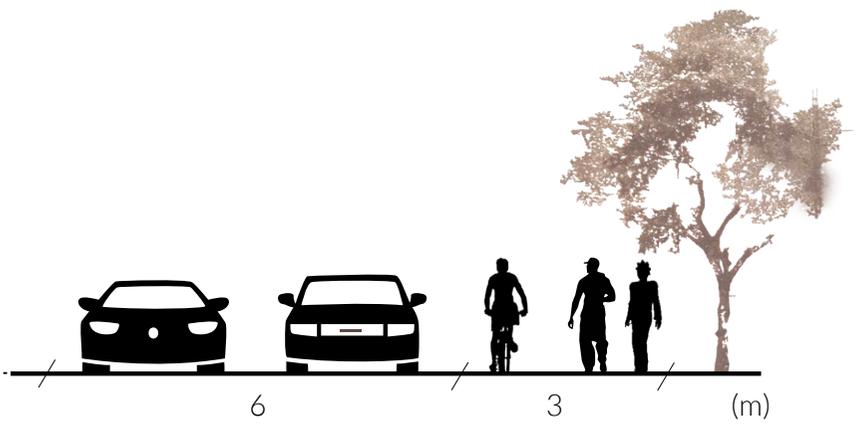
The network



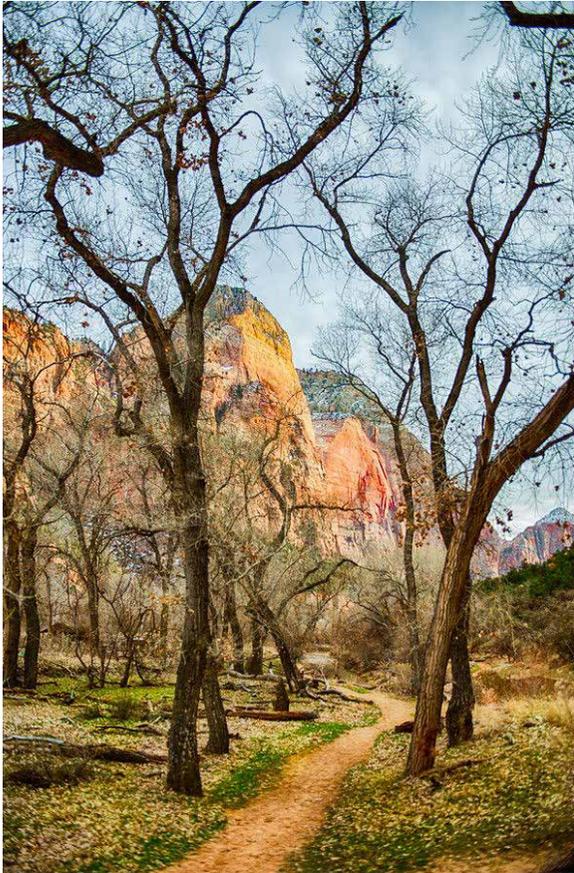
To increase connection within, to the area and to the water, one wide path going along the water in north-south direction and two going in east-west direction are proposed. They are widely shaped to increase accessibility for both pedestrians and cyclists and to enhance the use of sustainable modes of travel.



The mixed used streets with cars, pedestrians and cyclists are suggested in order to connect the CBD with Luangni. Two more roads are proposed to be added in southeast and northwest direction, from Obote Road in direct connection to the main street, going between Busia/the airport and Nairobi. Pedestrians and cyclists should have priority and reducing the road width would decrease car speed. Parking facilities are suggested for the entrance nearby the new location for the carwash. Cars can access Luangni for e.g. necessary goods transport, still with priority for pedestrians.



Inspiration



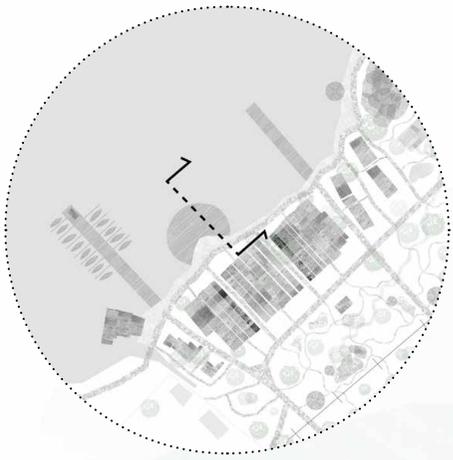
Meandering footpath in Zion National Park, Utah (Chris Riesta, n.d.)



Vester Voldgade green pedestrian and cycle path, Copenhagen, Denmark (Rasmus Hjortshøj, 2013)



Pedestrian and cycle path along the waterfront in Kungsholmen, Stockholm, Sweden.



A jetty to connect and get closer to the water

A vivid and active platform for events, exhibitions and performances

A coherent path along the water for pedestrians and cyclists

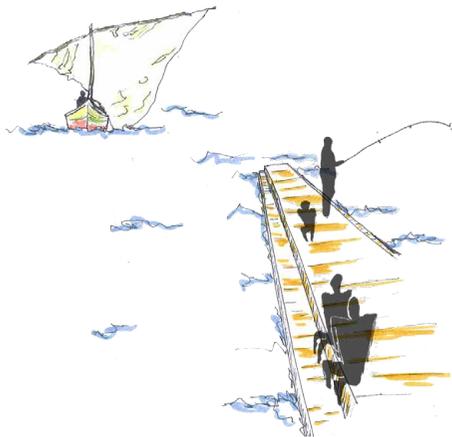
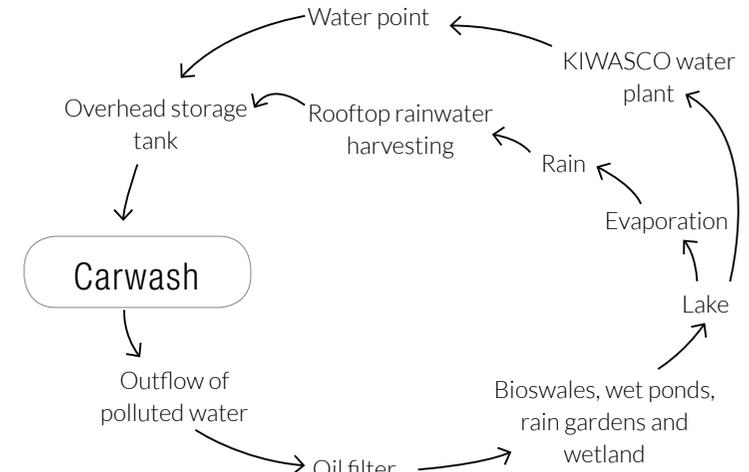




JETTY, BOARDWALK AND CARWASH

The proposal includes three jetties as meeting places, with three different purposes. One vivid jetty for events, performances and exhibitions in connection to the community and entrepreneurship center. One calm and relaxing jetty where you can sit down and watch over the lake while wooden sailing boats (dhows) pass by. The jetty with boats docked to it, expanding Oginga Odinga road over the lake, is intended to lead visitors to the boat tour guides office at the end. The jetties expands the walkable surface from the city over the water, and get visitors closer to the lake and its habitat.

The carwash is suggested to be relocated next to the parking at the entrance of Luangni, and now has sustainable water management that cleans the polluted before entering the lake. The overhead tank store water to use when the water point is out of order and in dry seasons. The roof over the carwash could both work as rain protection for the carwashers and as a catchment area for rainwater harvesting. Water that can be used for the carwashing. This would keep the existing job opportunities and satisfy visitors, in the way that they still can clean their vehicles without it blocking the view over the lake, and furthermore without causing environmental degradation.



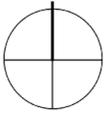
A jetty to meet, sit down and relax



A jetty with an office for the boat tour companies



Carwash relocated from the shore and with a sustainable water management



ROOF COVERED
CARWASH

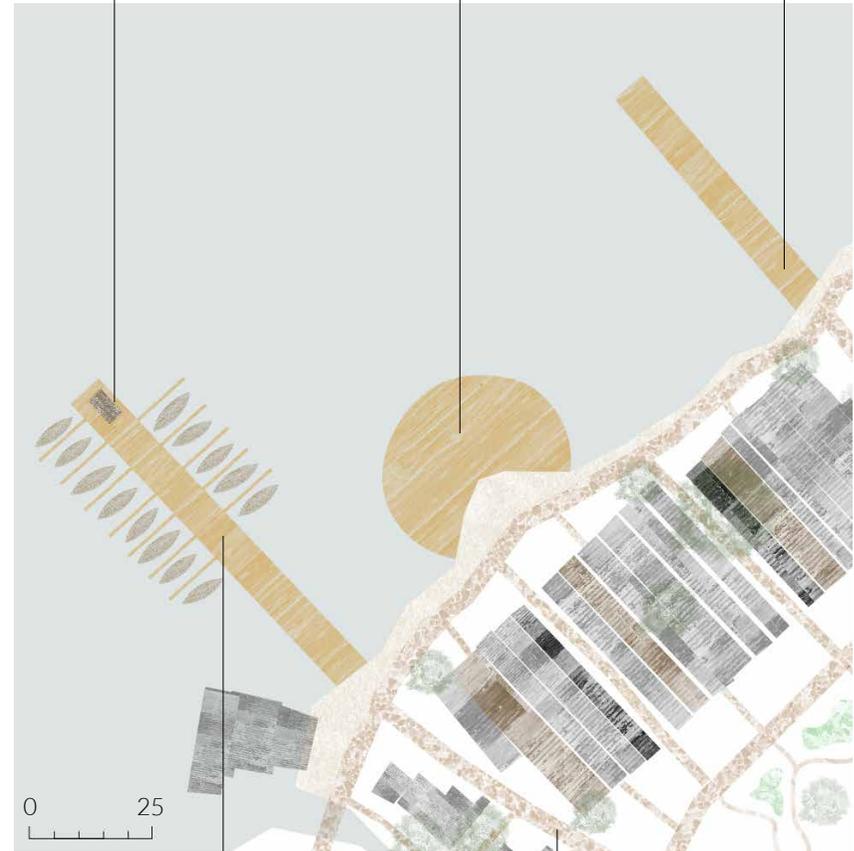


PARKING SPACE

BOAT TOUR
OFFICE

JETTY IN CONNECTION
TO THE CENTER

JETTY WITH SEATING
FACILITIES



JETTY FOR BOATS

THE JETTY'S PROLONG MAIN
ROADS FROM THE CBD OVER
THE LAKE

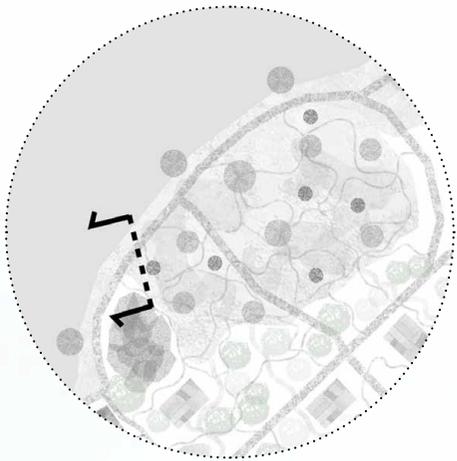
inspiration



Wooden catamaran for boat tours at Diani Beach, Kenya



Wooden jetty to sit and relax on the water, Kungsholmen, Stockholm, Sweden



skyview tower to
come closer to the
sky and birdlife



The public path provides an
opportunity to experience
the wetlands bursting
natural habitat closely



wetland with native plants
as mangroves, hippo grass,
water fern and papyrus that
cleans contaminated water



increase meeting places



job opportunities



use existing qualities



closed loop



diversity



sustainable development



coherent paths



sustainable behaviour



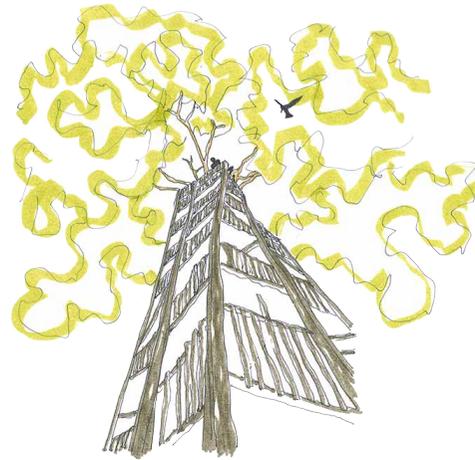
accessible lake



WETLAND WITH LODGING HUTS

The wetland is proposed to be placed at the already existing wet area, in the intersection between land and water. The wetland is intended to increase biodiversity, treat polluted water and create a place to be close to nature, to explore and learn about nature. Through an organic path accessible for all people, one could get an authentic experience in the wetland where biodiversity thrives. The path can also provide an opportunity for income bringing activities, as guided educational walks about the habitat in wetlands and Lake Victoria.

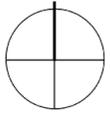
Huts with sleeping facilities inspired by traditional Luo huts are proposed, in order to enable tourists to a unique experience with both the Luo culture and the direct connection to the wetland with its rich biodiversity and the lake. The new wetland together with the hotels could furthermore provide more job opportunities, complement and lift the other functions through attracting a wider range of tourists, which presumably also would use the existing functions as well.



Explore nature up in tree and bird level in the skyview tower at various places in the wetland.

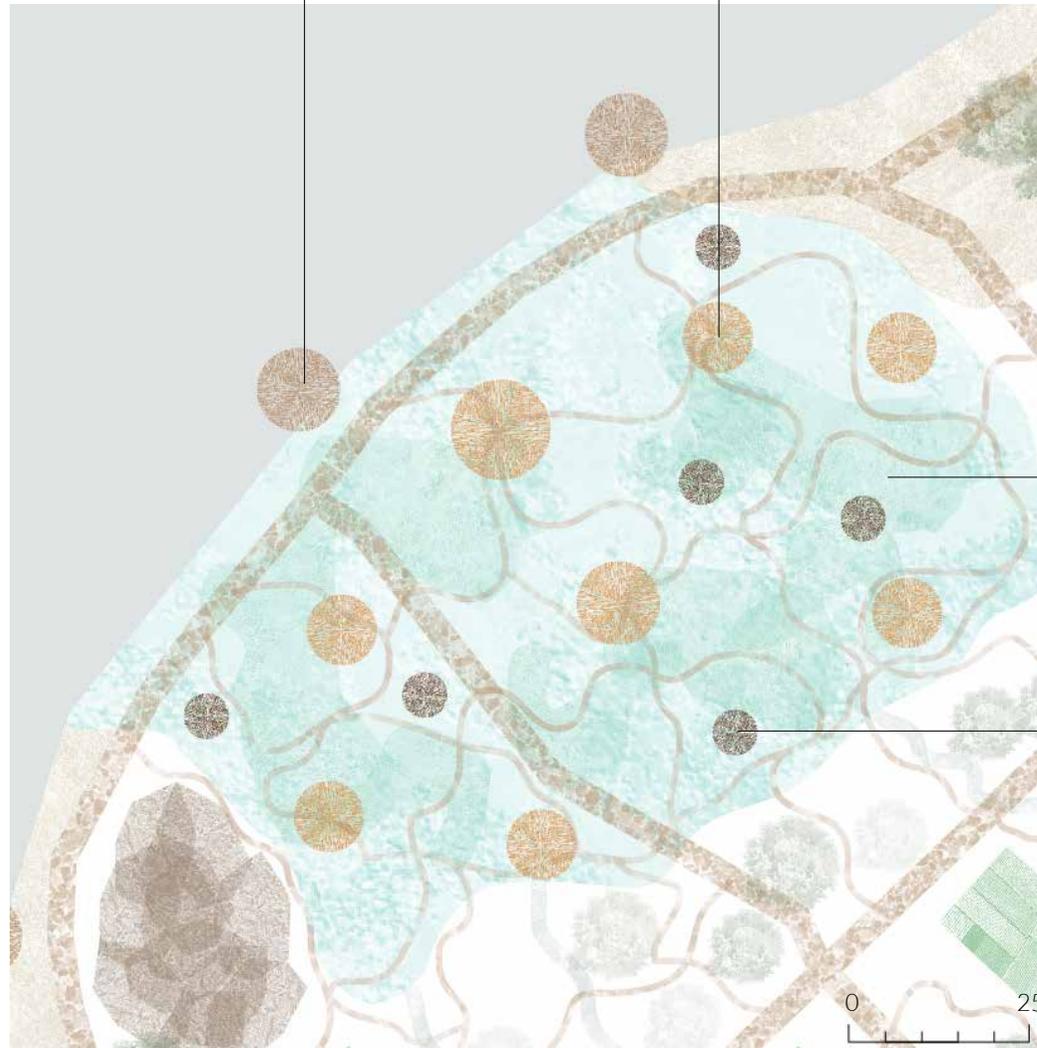


Wetland accessible for the public by an organic path and Luo huts that provides sleeping facilities in this exuberant natural habitat



HUT PAVILIONS
ALONG THE SHORE

LODGING HUTS ORGANISED
AS A TRADITIONAL LUO
COMMUNITY



WETLAND WITH
SEVERAL FUNCTIONS

SKYVIEW TOWERS
PLACED AROUND THE
WETLAND

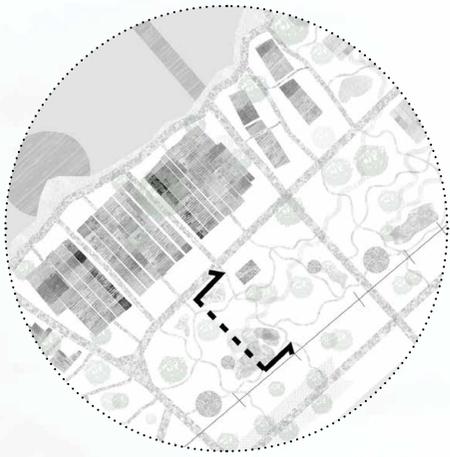
inspiration



Lodging huts in the occasionally flooded jungle (Juma Amazon Lodge, n.d.)



Meandering path in mangrove wetland in Waitangi, New Zealand (Julia and Gordon Gardner, 2007).



rain garden as an aesthetic feature with a variety of native plants

public park for all to enjoy and get closer to nature

bioswale as path in dry season

increased vegetation delays surface runoffs and erosion

wet pond and water as a recreational element



diversity



sustainable development



sustainable behaviour



increase meeting places



job opportunities



closed loop



use existing qualities

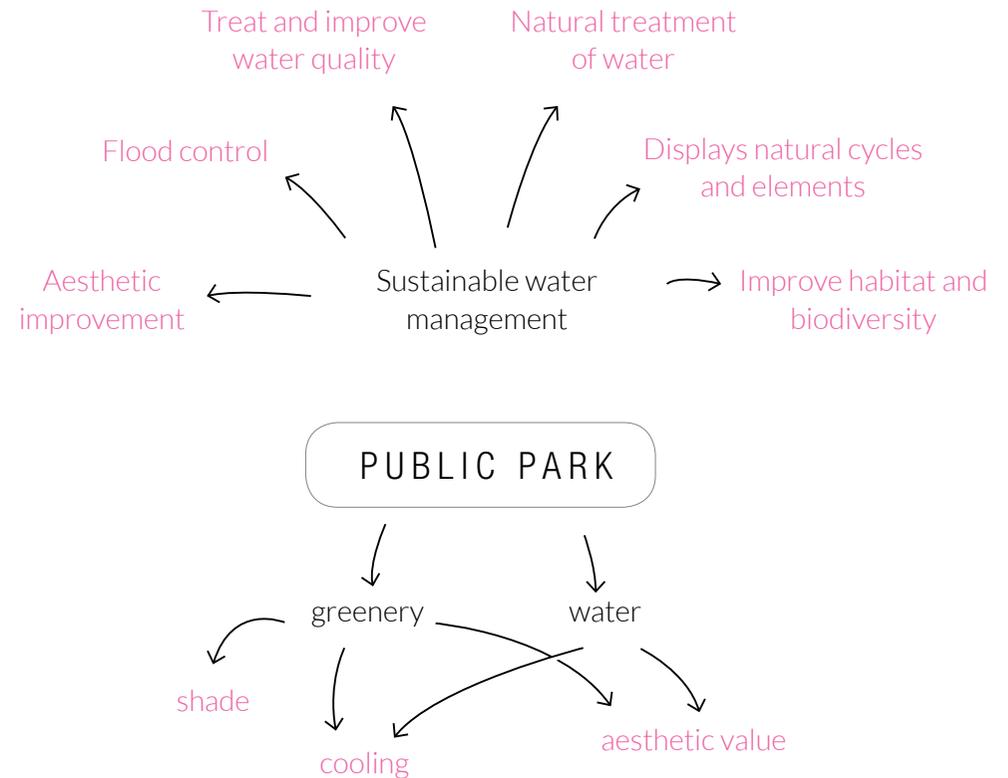


PUBLIC PARK, BIOSWALES, RAIN GARDENS AND WET PONDS

With a lack of public green parks in Kisumu and accessible public spaces along the lake, the proposed park can be a place for recreational activities. A place to relax for all people. A place where both locals and tourists can reside and meet. A calm place in connection to the more vivid spaces, with the hotels, market and the activity areas.

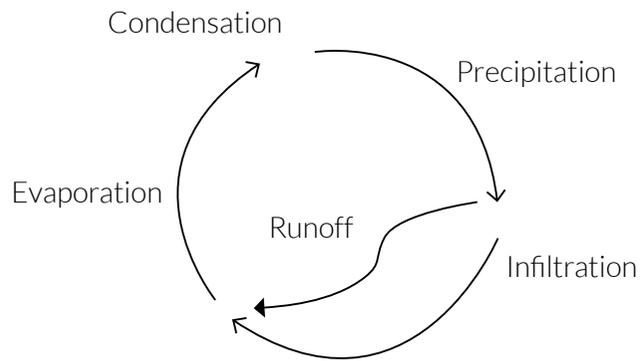
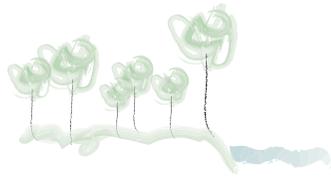
The proposed public park, with bioswales, rain gardens and wet ponds have various purposes. It increases biodiversity, can treat contaminated water in a natural way and prevent flooding. The water flow, the water ponds and enhanced vegetation can furthermore create a pleasant recreational element in the park. Greenery is also improving air quality and provides shade and cooling in a tropical climate.

The water flow and water management elements can display natural cycles, nature's own way of handling stormwater, and thereby give a genuine experience in nature. Information signs and guided walks in the park to explain these natural cycles, can foster more job opportunities and at the same time connect people with nature. With smaller stones at the bottom of the bioswales it can be used as walking path during dry seasons.



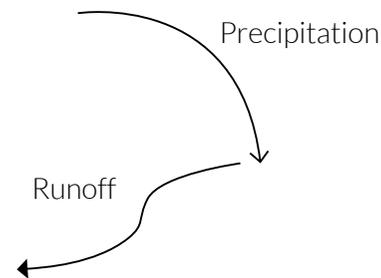
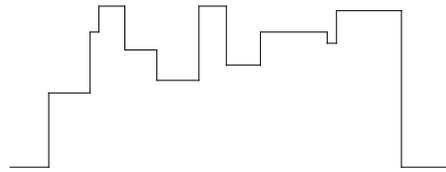
Natural-, Conventional- and Sustainable water cycle

NATURAL SYSTEMS



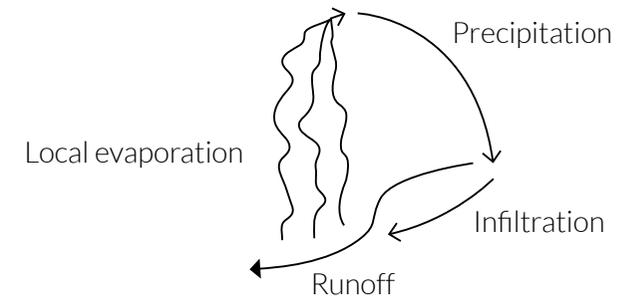
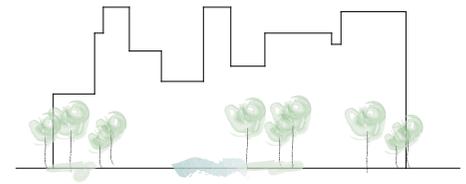
Closed loop water cycle

URBAN AREA WITHOUT SUSTAINABLE WATER MANAGEMENT



Disturbed water cycle - polluted water, can not infiltrate the ground due to paved surfaces. No time for evaporation because of rapid collection and discharge to drainage systems.

URBAN AREA WITH SUSTAINABLE WATER MANAGEMENT



Replicating the natural water cycle. Water infiltrates and recharge the groundwater. There is a high evaporation and low runoffs.

Conventional water management

Urban areas with its hard surfaces and today's conventional collection of water in drainage systems disturbs the natural water cycle and creates increased runoffs. The current system has a negative impact on groundwater recharge, water supplies, qualitative and quantitative state of receiving rivers, and urban climate.

Problems with conventional water management systems:

- Decreased groundwater recharge rates can limit available drinking water in cities.
- Reduced infiltration and evaporation in cities means that the local climate becomes warmer and dryer.
- During heavy periods of rain sewer systems can increase the risk of flooding, causing overflow to receiving rivers.
- Lack of ability to adapt to uncertain or changing city developments and climate change.

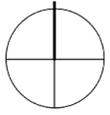
(Hoyer, 2011)

Sustainable water management

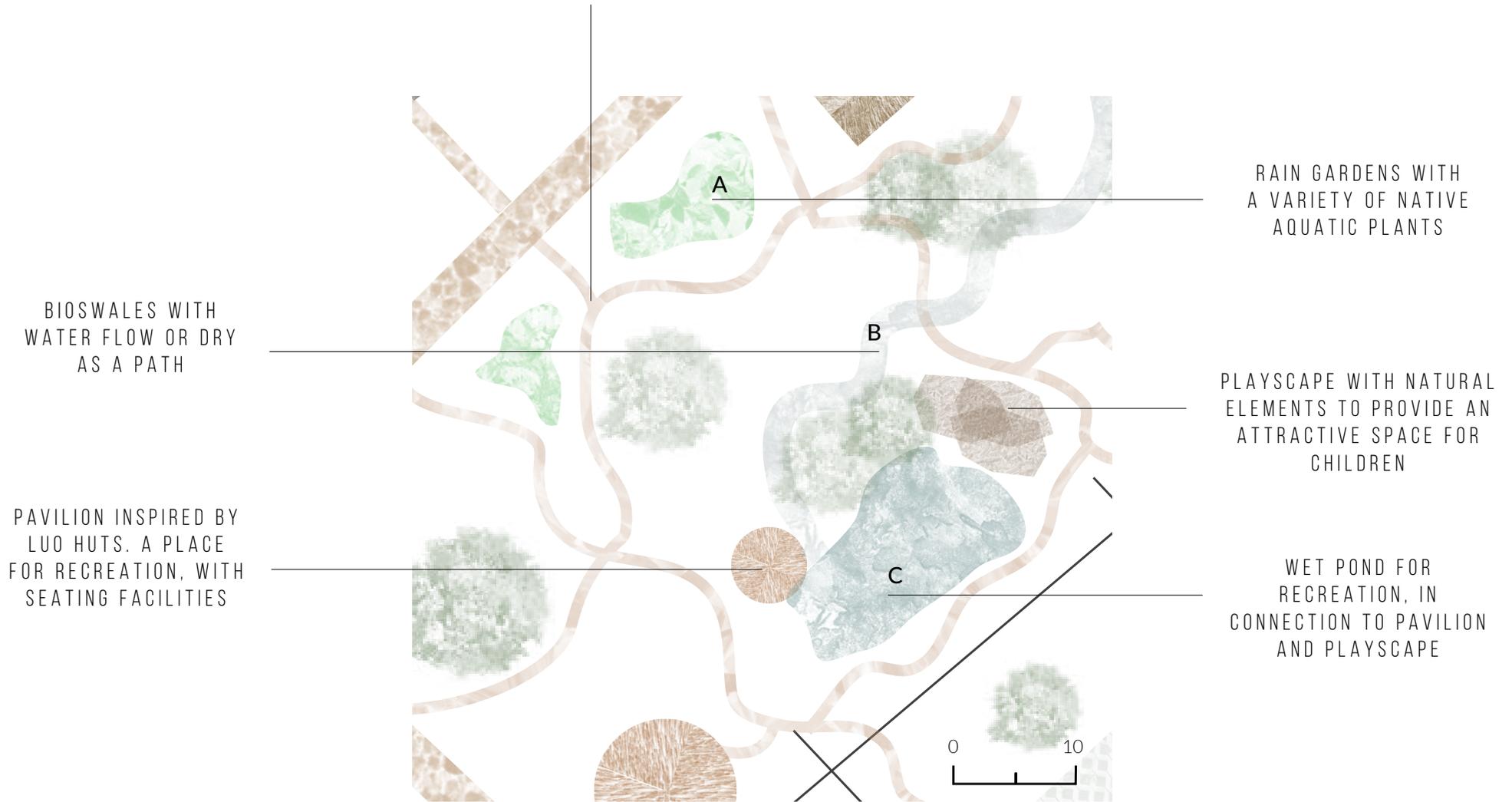
Unlike conventional way of handling water, sustainable water management has a high evaporation, low and slow runoff and a high infiltration and groundwater recharge. Plants and infiltration through the ground treats the water and slows down the water flow speed. The aim of this system is to close the loop, bring back water into a nature-orientated water cycle in the city. It is a way of visualising water use and management to people. Unlike conventional water systems that are hidden underground, this system can enhance awareness and a responsible use of water (Hoyer, 2011).

Water Sensitive Urban Design (WSUD) is one approach of sustainable water management. It is a long term design approach to manage freshwater, wastewater and stormwater (Stauffer, n.d.). The strategic way of WSUD is called Integrated Urban Water Management (IUWM) and is recommended by the World Bank to manage water in a more sustainable way (The World Bank Group, n.d.a). It has already been implemented in several African cities, to deal with water shortage (The World Bank Group, n.d.b)

The proposed bioswales, rain gardens, wet ponds and the wetland is a conceptual proposal and example of how WSUD can create a closed loop system for water in Luangni. The different interventions are a way of treating contaminated water and detaining runoffs, by replicating nature's own way of handling water, through infiltration, filtering, storing and evaporating (Hoyer, 2011).



ORGANIC PATHS MENDERS
THROUGH THE PARK



Sustainable water management in Luangni

The stormwater can flow and be cleaned through several water management elements and create a closed loop system. Besides that the water gets cleaned through the process it can furthermore serve as an aesthetic feature, being used for irrigation, for detaining runoffs, before it finally enters the lake (Hoyer, 2011).

Stormwater as well as wastewater, filtered water from the carwash for example, can be collected in the wet ponds before the slope, where outlet structures controls the outflow by letting out water gradually, while some water infiltrates and recharge the groundwater. Wet ponds is a way of storing and holding water. Through filtration devices with wetland plants or/and animals the water circulates and improves water quality. The water can thereafter be used to irrigate cultivation or be used for other water supply needs (Hoyer, 2011).

The water can flow between different water bodies through the bioswales, which is a linear and vegetated layered drainage that transports water, at the same time as some of it gets infiltrated through a permeable base with different soil types and recharges the groundwater (Hoyer, 2011). Rain gardens can receive water from bioswales and infiltrate it slowly into the ground. Rain gardens are similar to bioswales, with layered vegetation and various soil types for slow infiltration. They detain water for a while before it gets soaked down into the soil (Hoyer, 2011).

The wetland use vegetation, soil, and organisms to treat contaminated water. Through the right design it can treat both blackwater, greywater and brownwater and the effluent can be used for e.g. irrigation or be directly discharged to receiving water bodies (Stauffer, Spuhler, n.d.).

inspiration



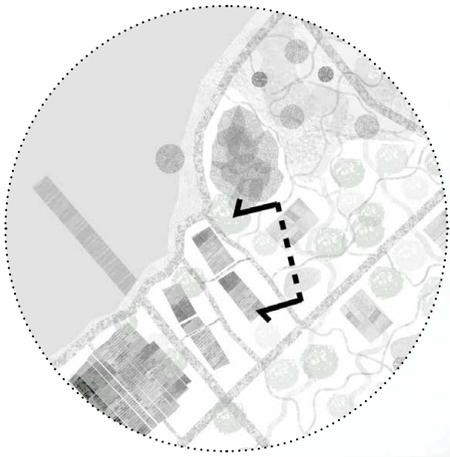
A. Rain gardens with native plants, treat, store and release water at a controlled rate (Rebecca A. O'Neal, n.d.).



B. Bioswale is a ditch designed to delay and treat water. A dry bioswale can be used as a walking path (Wilson Environmental Contracting, n.d.).



C. Wet ponds store large amounts of water and bring great recreational value. They improve water quality and control flooding (Eve Andersson, n.d.).



livestock as an
experience



cultivation as an
experience



diversity



sustainable development



sustainable behaviour



increase meeting places



job opportunities



closed loop



use existing qualities

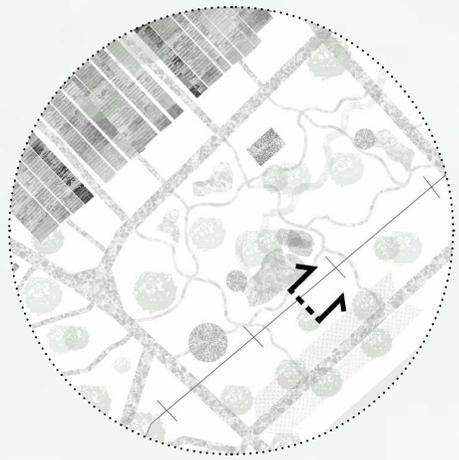


PUBLIC PARK, LIVESTOCK AND CULTIVATION

The proposed cultivation and livestock have two purposes, one as a tourist attraction to learn about food production and second to provide the hotels with raw ingredients. This would give visitors the possibility to experience something beyond the dinner at the hotels, the production of some of the food that is served at the hotels and the ability to actually see where the food comes from. This could enable the hotels to have fresh food most of the time and guiding tours through the food process could provide job opportunities.

Small scaled interventions placed under trees in the park are suggested, to enhance the possibility to stay, sit down, interact and meet under a cool place in the shadow. Small installations that collect water in the trees would create playful waterfalls. Introducing meeting places under trees is a way of taking advantage of existing qualities, as the trees are. The new interventions connected to trees can be placed at the slope with the view over the lake, or right next to the lake, the wet ponds, rain gardens, activity area and playscapes.





railway market in
containers

draisines



Shipping container converted into a movable restaurant,
New York City, USA (frameweb, 2011)



Draisine in Semboro, Indonesia (Werner and Hansjörg
Brutzer, 2015)

diversity



sustainable behaviour



closed loop



job opportunities



use existing qualities



RAILWAY MARKET AND DRAISINES

The railway is since long not in operation, and has potential to provide a temporary function until it is operating again. A moveable railway market inside containers, could be placed in Luangni one day and at another location another day, would attract visitors down to the lake and Luangni. The market would also provide a place for the hawkers to sell their products, as well as a place to sell food from the cultivation and livestock. At the top of the containers one can sit and enjoy the scenic view over the lake. The railway and containers have the possibility to have a variety of functions, as moveable exhibitions, performances, restaurants and events.

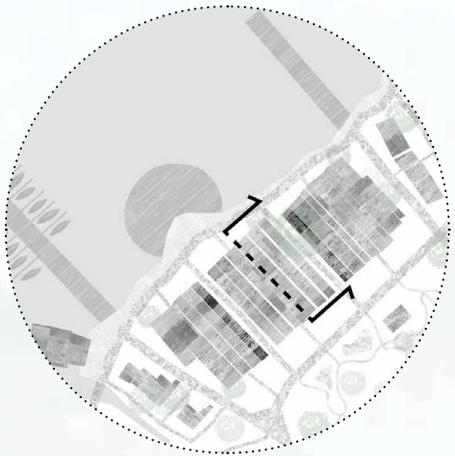
The proposed draisines is another way of exploring the lakefront and its natural habitat, in a slow and peaceful move, with an spectacular view over the lake just at the top of the slope.



Proposed draisines to take advantages of existing unused qualities as the railway.

Proposed use of the railway as a movable marketplace in shipping containers.





recycled material used in urban furniture

tourists creates crafts from recycled material

maintenance and construction with local and recycled material

merged constructions with openings in between

meetings between various stakeholders

experience how crafts are made



diversity



sustainable development



collaboration



sustainable behaviour



sustainable entrepreneurship



job opportunities



closed loop



COMMUNITY AND ENTREPRENEURSHIP CENTER

The center is proposed to work as a platform for training and capacity building, engagement, innovations and entrepreneurship. A place where you can go if you have an idea that you want to get help to develop. To get support on how to actually implement it. A place for existing stakeholders in Luangni to get help to develop their ideas in a sustainable way. The aim of the center is to create a more closed loop within the area and coexistence between actors so one and another can benefit from each others' businesses and work together towards the same goal. This will enable for a stronger and more resistant structure against adversity.

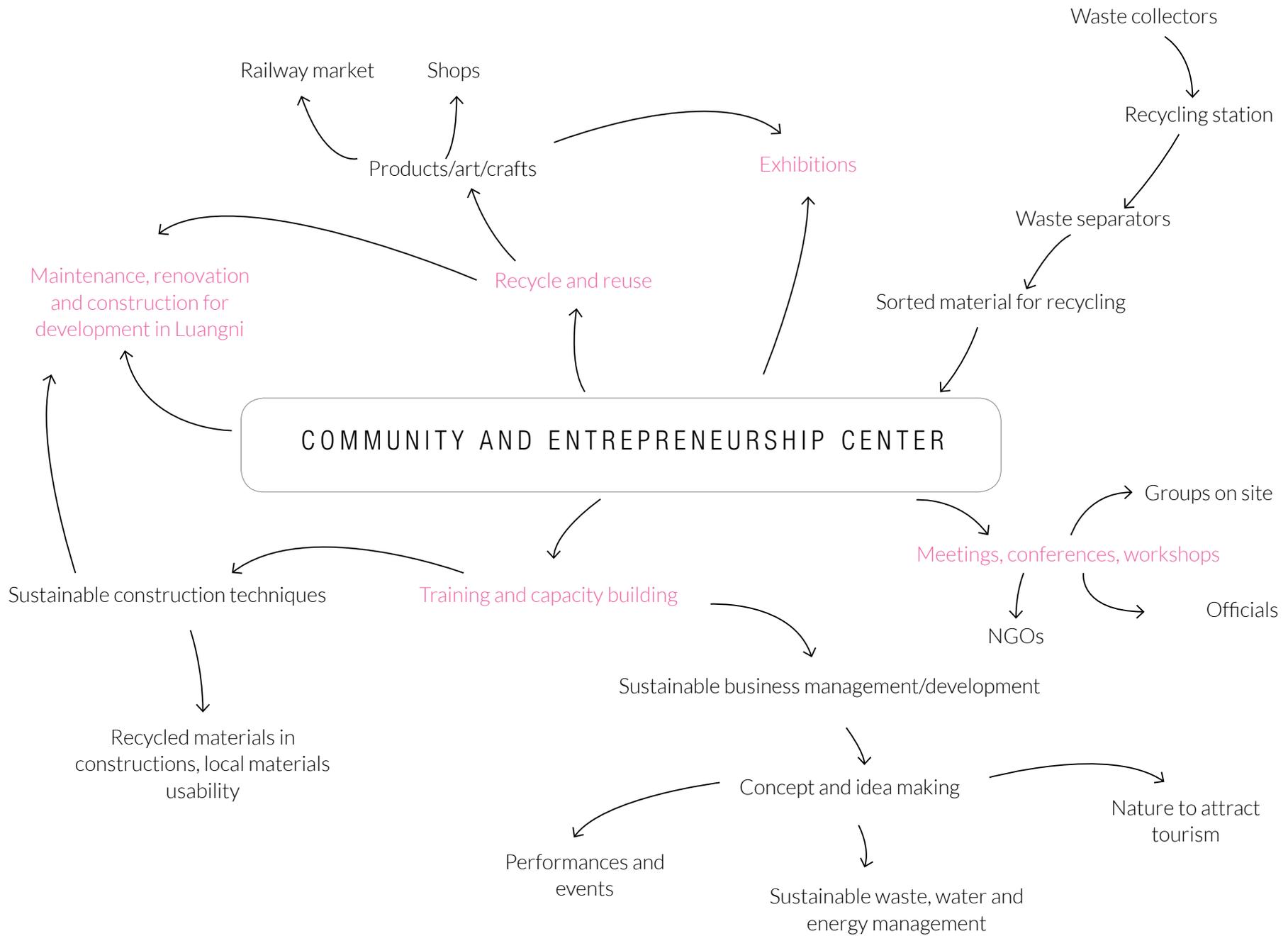
It is a place to attract a wider range of tourists, which could provide further job opportunities. It is a place where diversity and creativity can thrive through music, dance, acting and a variety of events. Here waste would be viewed as an asset that can be reused into products, maintenance and development for the area, at the same time as this could attract tourists. Maintenance and construction is suggested to be made by people active at the site, in order to create a feeling of ownership, which can enhance incentives to preserve and develop the area.

When the hyacinth invades the shore it could be harvested and reused into crafts and arts, which will leave the lake to the boat tour

companies to use. Here tourists could also learn how to make crafts themselves out of the hyacinth or recycled waste. Experience how crafts are made by artists, or have a look at recycled creations placed around Luangni and in the exhibition at the jetty. Here boat tour guides could learn about nature and the habitat of Lake Victoria to give exiting tours to tourists.

The area provides a possibility to have guided tours about sustainable water management, sustainable cultivation and livestock keeping, sustainable waste management and display different ways of recycling waste. A few key persons, driving forces in Luangni, can learn from professionals, from e.g. NGOs in each field and then teach it to others gradually.

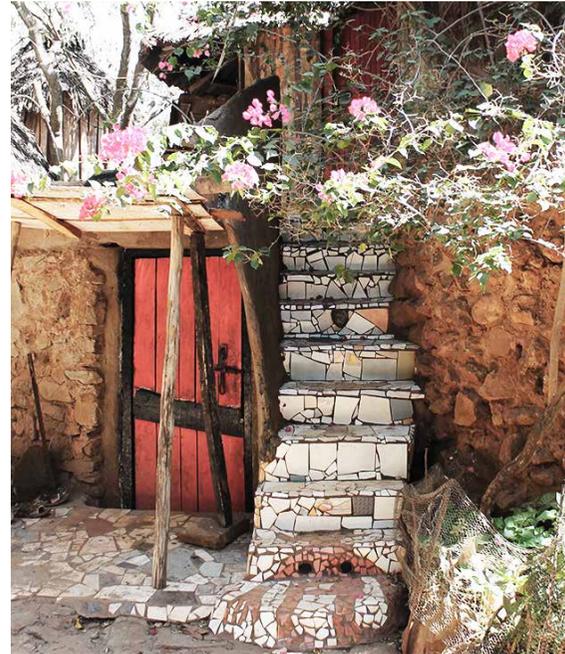
The center with its location right by the lake can also be a place which can hold conferences, meetings and events for officials and companies. It can work as a platform for meetings, interaction and inclusion, a place where the County can act on site, to share and get feedback on ongoing plans by people that actually operates and use the site. A place where visions can be shared between and amongst all stakeholders in Luangni, officials, the land owners, NGOs and CBOs on site.



inspiration



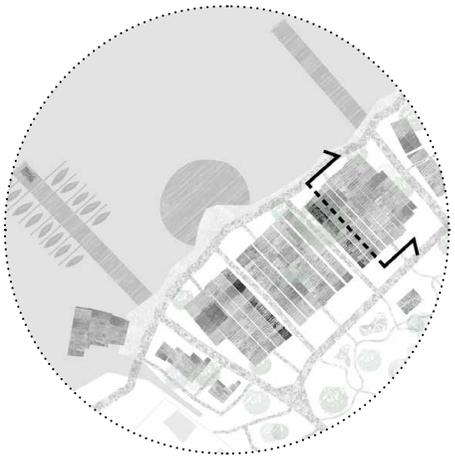
Recycled material used in construction of paths and fence, amongst other things, Kitengela Hot Glass, Nairobi, Kenya.



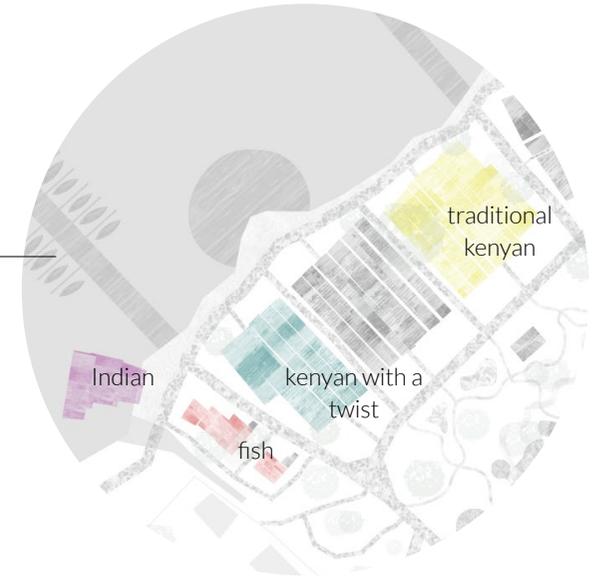
Recycled ceramic used in stair, Kitengela Hot Glass, Nairobi, Kenya.



Recycled material used to create art and crafts, Zingira Nyanza Community Crafts, Kisumu, Kenya.



different themes and character providing various options for visitors



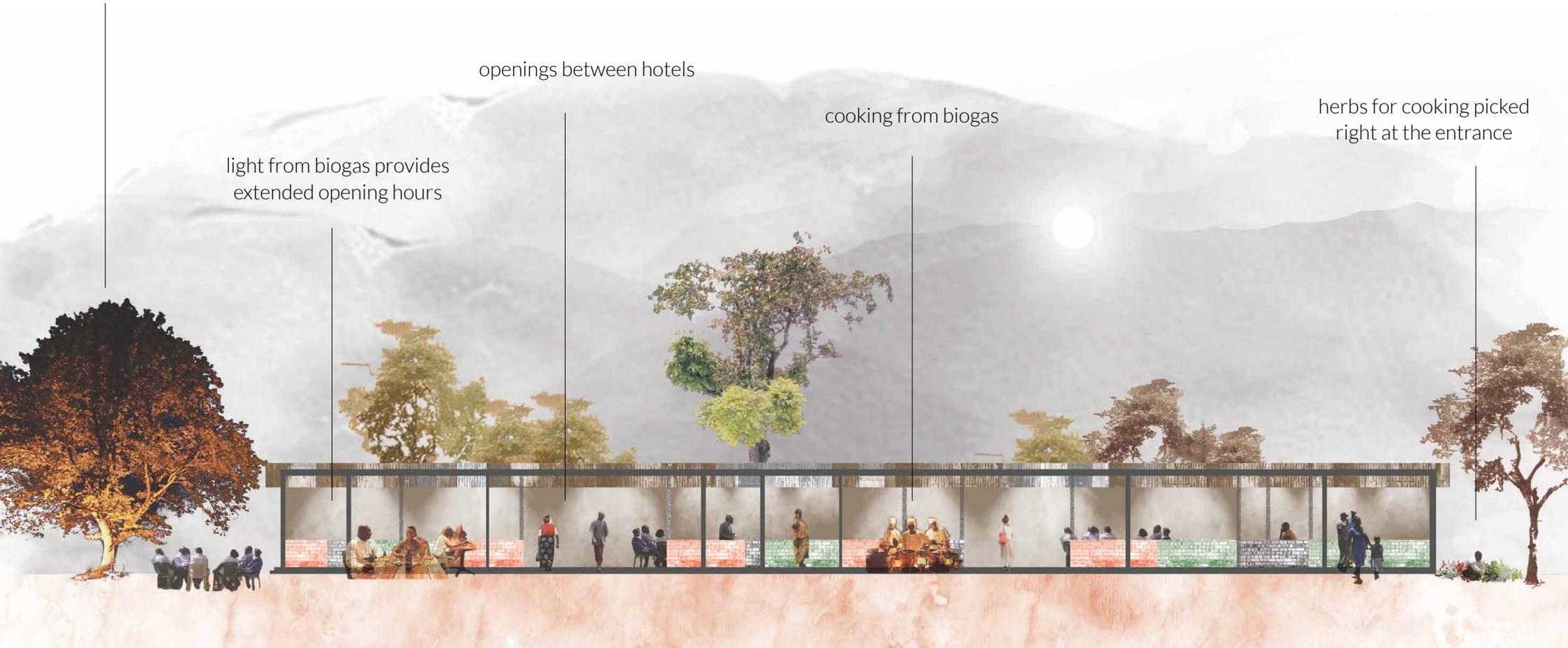
light that illuminates trees

openings between hotels

cooking from biogas

herbs for cooking picked right at the entrance

light from biogas provides extended opening hours



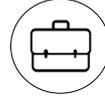
diversity



sustainable
development



job
opportunities



closed loop



use existing
qualities



HOTELS

The design proposal implies that the hotels can be opened up between each other and be merged together to create a more coherent appearance, space for complementing functions and create less competition. The basic shape and construction of the hotels are suggested to be kept. To be refurbished and extended gradually, to be able for stakeholders to adapt and to preserve the rough- and dynamic character.

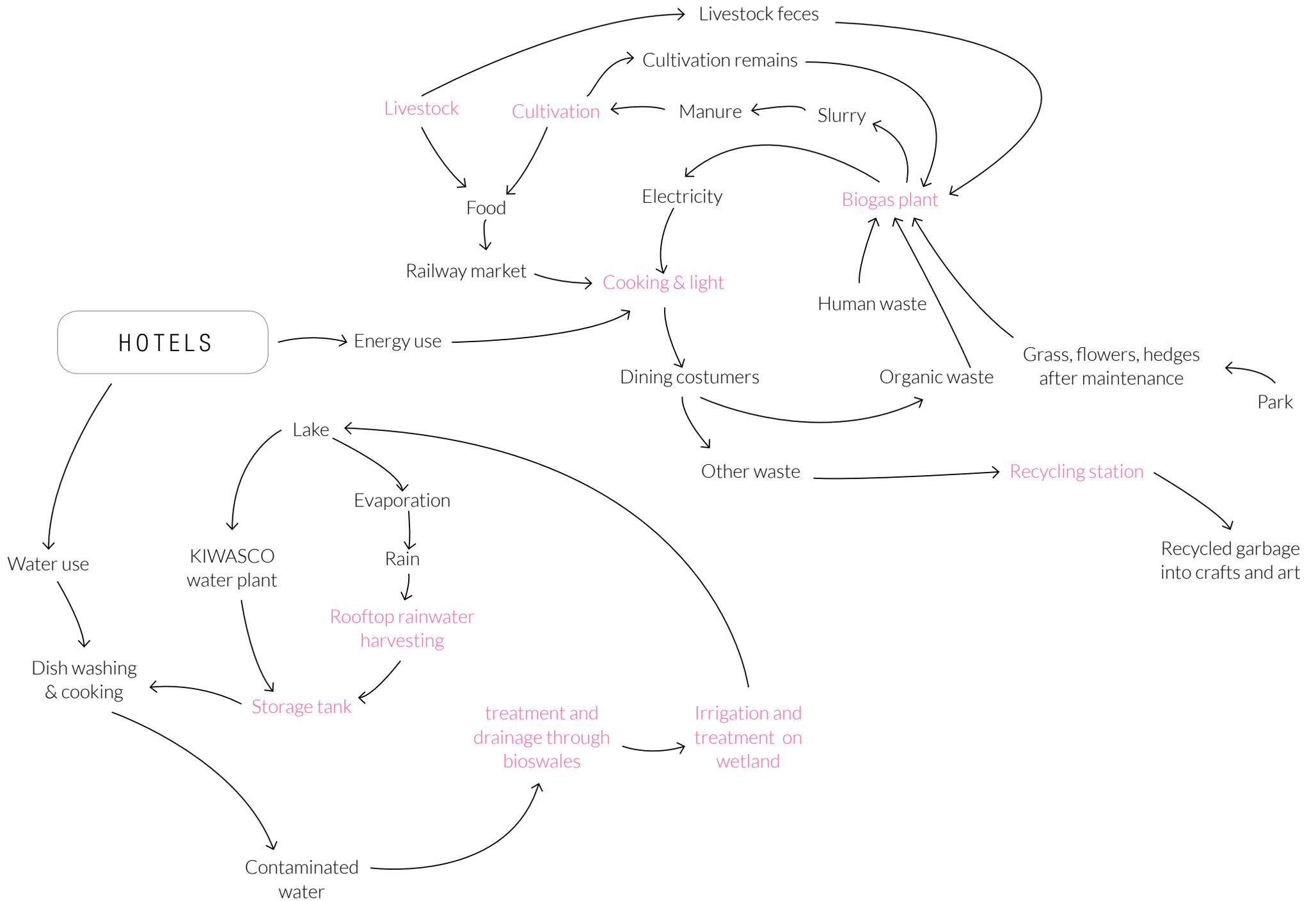
The different hoteliers could benefit from working together and niche the hotels in a certain theme as e.g. traditional Kenyan dishes, Kenyan dishes with a twist, fish or Indian dishes, or have other functions than serving food. Themes and functions could complement each other instead of being competitors. The proposed community center could work closely together with the hoteliers and provide help with renovation and develop the hotels into permanent structures.

Introducing gradually and in different phases a biogas plant, bioswales, wetland, recycling station and rainwater harvesting could provide a possibility for the hoteliers to have sustainable water, energy and waste management, where everything is reused in a circular system. The organic and human waste is an asset that could get processed by a biogas plant and generate electricity for the hotels which could be used for cooking or for light.

Rooftop rainwater harvesting together with a storage tank could provide a back up system when the water points are not distributing any water. The contaminated water from dish washing and cooking would get cleaned and transported through the water management elements, to get cleaned before it enters the lake.

The proposed cultivation and livestock in the area could provide fresh and local raw ingredients to have in served dishes. Furthermore, it would provide an authentic experience where visitors can see and follow the food production at site from its origin through the whole process to the plate. Introducing production of electricity from a biogas plant in combination with solar cell driven streetlights would provide an opportunity for hotels to have longer opening hours and expand with other complementary functions. As for example a bar and performances which could be suitable when night falls.

The proposed structure for hotels could provide a place where visitors can get a real and genuine Kenyan experience and where citizens of Kisumu still can enjoy the popular Tilapia fish.



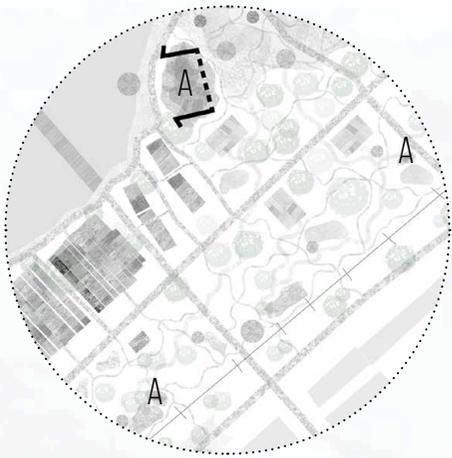
inspiration



Restaurant inspired by the South African market with woven baskets and african wax prints (Retail design blog, UK, 2012)



Art, a simple way to enhance a structure, Ayerou, Niger.(Therry Brésillion, n.d.)



various kinds of sports
take place here

playscapes made out of
reused materials

outdoor gym right
next to the lake



diversity



sustainable development



sustainable behaviour



accessible lake



increase meeting places



job opportunities



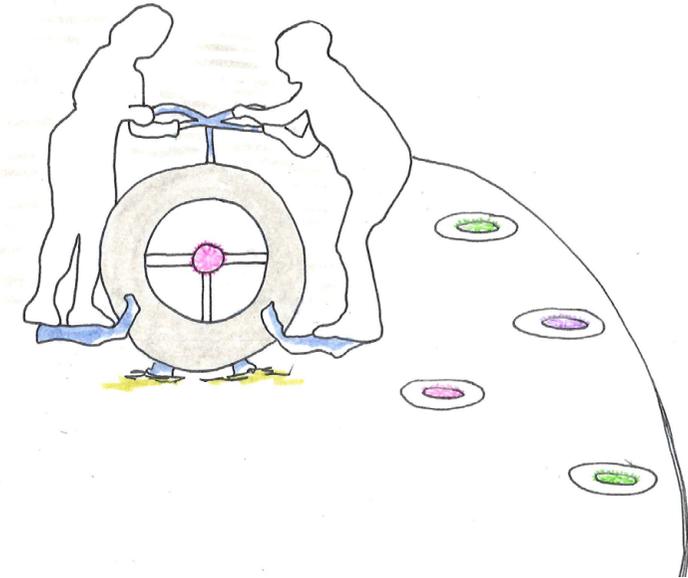
use existing qualities



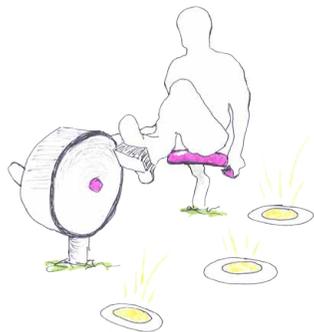
ACTIVITY AREA

The activity area which is proposed to be situated between the hotels and the wetland right at the lake, is a place that can provide various kinds of physical activity to take place and have something for every age. It can both attract people staying in the huts and inhabitants of Kisumu, which could help to create a more diverse place.

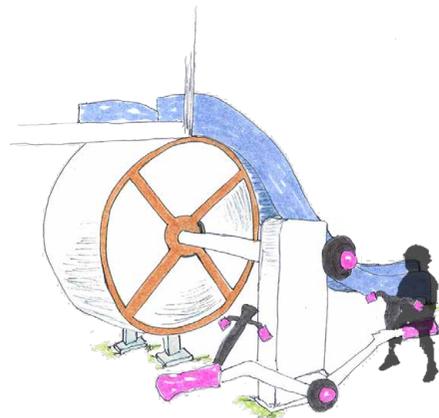
The proposed three playscapes, one in the activity area and two at the slope in the park, are a combination of natural and recycled materials as wood and old tires etc., together with new modern features that can illustrate energy use in a playful and interactive way. The kinetic energy that are produced while working out at the gym or playing at the playground can be transformed into electricity and light, to create an interactive and playful place to learn while playing or working out. To illustrate and remind about energy use, but also to create light in a sustainable way and take care of the energy that is produced.



Create light while playing



Exercise and create light



Turn the waterwheel by swinging

inspiration



Playground equipment that harness kid energy and transforms it into electricity that is used for light (Empower Playgrounds, Inc., Ghana, West Africa, n.d.)



Outdoor gym that converts energy generated by users of its exercise equipment into usable electricity (TGO Green Heart, England, n.d.).



Playground made by Kounkuey Design Initiative together with the community by recycled material, as rubber tubes and tires, Kibera, Nairobi, Kenya.



Playground equipment made of recycled steel and rubber, Kitengela Hot Glass, Nairobi, Kenya.



SUMMARY

The proposal with illustrated features and elements in this chapter should be seen as options and as inspiration, not as fully evaluated and obvious solutions. A majority of proposed elements needs to be further explored and tested, to find out what is most suitable for a sustainable development of Luangni Beach.

However, the proposal for Luangni provides a possible way of raising awareness about the environment and at the same time enhance for more job opportunities and sustainable sources of income.

It provides a platform where creativity, knowledge and entrepreneurship spirits can flow, with a focus on sustainable use of resources and nature as a potential source of income.

The design proposal implies that public access and recreation permeates the area and the lake is accessible for all people from numerous directions. Luangni could provide a scenic place for the inhabitants of Kisumu as well as for visitors from all over the world.



REFLECTIONS

PROCESS

To get the proposal to the next level it would have been beneficial to get feedback in the making of the proposal, from people active in the area as well as the County and land owners. Since it was not possible to get detailed maps over Luangni, the process got delayed, due to the making of own maps and thorough inventories. Unfortunately, this resulted in that there was not enough time to have workshops, to get feedback on the proposal in the sketching phase. However, workshops are often time consuming and since I was new in that context it would have taken even more time. It would presumably have resulted in less time spent on sketching, illustrating and making the proposal transparent and understandable.

In the sketch process, I started out with some small scale interventions with the aim of avoiding gentrification. However, after the site visits, inventories and interviews I saw that there was a major need for more job opportunities and to develop the area to attract income bringing activities. Therefore, the proposal ended up with some major interventions and some smaller elements to still keep the rough character.

It should be noted that the proposal is a result of how far I came in the sketching process and should not be seen as a finished product, rather as a work in progress.



THE PROPOSAL

Proposal in relation to ongoing plans

The ongoing plans over the lakefront is so far rather strategic which means that it is hard to relate the proposal to existing plans over Luangni, since they are not in detail. What can be seen in the plans is the proposed functions and main road network.

The accommodations which is suggested to be placed at the lakefront is most valid, due to housing shortage. However, the lakefront stretches over a large area and there are several areas along this stretch where it could be more suitable for them to be placed rather than at Luangni. The proposed accommodation in the ongoing plans is furthermore suggested to be placed down to the south, as an extension of existing housing area. Since Luangni is situated in direct connection to the city and the road down here is already seen as the main entrance to the lakefront area, it would be beneficial to place a public park here.

The new throughfare that stretches along the lake in the ongoing plans is alike to what is suggested in the proposal. However, I have suggested more connection down to the lake from the city, two more than for the ongoing plans. This could be due to the different scales in the proposal, since I have made a more detailed proposal. Luangni together with Tipalia and Kuchonji is an area of 900 meters withouth any entrance, which means that there is a great need of more connections here.

Implementation

With implementation, Luangni should be considered in the context of the whole lakefront. Further analysis on e.g. complementary functions, infrastructure etc. throughout the whole lakefront, should be done before a stepwise implementation of the proposal over Luangni can be made.

If the development is carried out all at once there is a risk of gentrification. That the area more or less will attract only wealthy people and thereby exclude some people from the area, with higher price levels and a too tidy and organised character. A stepwise and gradual implementation is therefore required, to ensure that the dynamic character of Luangni is not extinguished, and to predict gentrification. The step by step implementation is furthermore necessary in order to be able to see how the site develops by the people, by stakeholders, inhabitants and visitors. How much the site can hold due to the extent of existing activities, and what the demands will come to be.

For implementation of the proposal there need to be a supporting and solid structure with increased collaboration and a will to work towards the same goal between

all stakeholders. Other obstacles that likely would hamper implementation, is the disagreement about land ownership. How the implementation process may look like is something that could be useful to investigate further.

Encourage to a sustainable lifestyle

For the proposal to be able to function the stakeholders at site need to be engaged and have a will to operate and implement it. There is always a possibility that people do not have the will to behave sustainable and can not see the potential of it. However if nature and behaving sustainable can bring income possibilities as illustrated in the thesis it will presumably be a strong incentive for people to be more committed to preserve and care about nature. Furthermore the research of design approaches has suggested that the more exposed we are to nature the more keen we are in preserving it.

Conceptual scale

The proposal should be seen as a conceptual an inspirational plan of how the lakefront can develop in a sustainable way and not as definitive solutions. There are several aspects that needs to be further investigated, to be able to take the proposal to the next level. For example a focus on a more detailed, technical or architectural level at e.g. the water management, the hotels renovation and extension, or the community and entrepreneurship center. A proposal of the more broader scale with the whole lakefront as the boundary and the connection to the city and Kenya could also be interesting to investigate further.

Tourism

The aim of the proposal is to both attract international- and local tourists as well as residents. It can be contradictory needs and diseries between these groups which can result in that some feel more welcome in the area than others, and that the area becomes homogen instead of diverse. However, the aim has been to create a variety of functions which can complement each other and work well together. Some elements in the proposal are costly and some parts will presumably attract a more affluent croud, resulting in a risk of gentrification. However, a large amount of the proposal is meant for the public, as the park, the thouroughfares, wetland and activity areas. Moreover, the base of the hotels structur is preserved to maintain the rather rough character. It is recommended to test some parts first on a small scale, to see how it develops over time, refering back to a gradual implementation.

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PERSONAL COMMUNICATION

The communication have been conducted through structured, semi-structured and spontaneous conversation. The material has been gathered through notes during the conversation and has therefore not been transcribed fully.

Beatrice N. Mbula, Natural Resource Specialist at LVEMP, mars 12th, 2015

Belinda Nyakinya, Deputy Director of Environment, Kisumu County Admin, mars 9th, 2015

Boat tour guides at Luangni Beach, mars 23th and 30th, 2015

Carwashers at Luangni Beach, mars 23th, 2015

Evance Odiambo, Lead Coordinator at Zingira Nyanza Community Crafts, mars 17th, 2015

Everlyne Otieno, City Planner, Kisumu County Administration, Mars 30th, 2015

George Oweke, Guide and Fisherman based at Dunga Beach in Lake Victoria, mars 14th, 2015

Hawkers at Luangni Beach, mars 30th, 2015

Head of Beach Management Unit on Tilapia Beach/Kichinjio fish landing area, mars 4th, 2015

Hotel owners at Luangni Beach, mars 23th and mars 30th 2015

Laban Onong'no, Chief Technical Adviser at the Water and Sanitation Unit, UN-habitat, mars 12th, 2015

Michael Mwalimu Disi, KRC Port Manager, mars 4th, 2015

Patrick Nyamita, Project Manager, KUP, mars 9th, 2015

Patrick S. Nzomo, KRC Estate Officer, mars 4th, 2015

Silas Maujih, Sociologist and Coordinator, UN-Habitat in Kisumu, several occasions

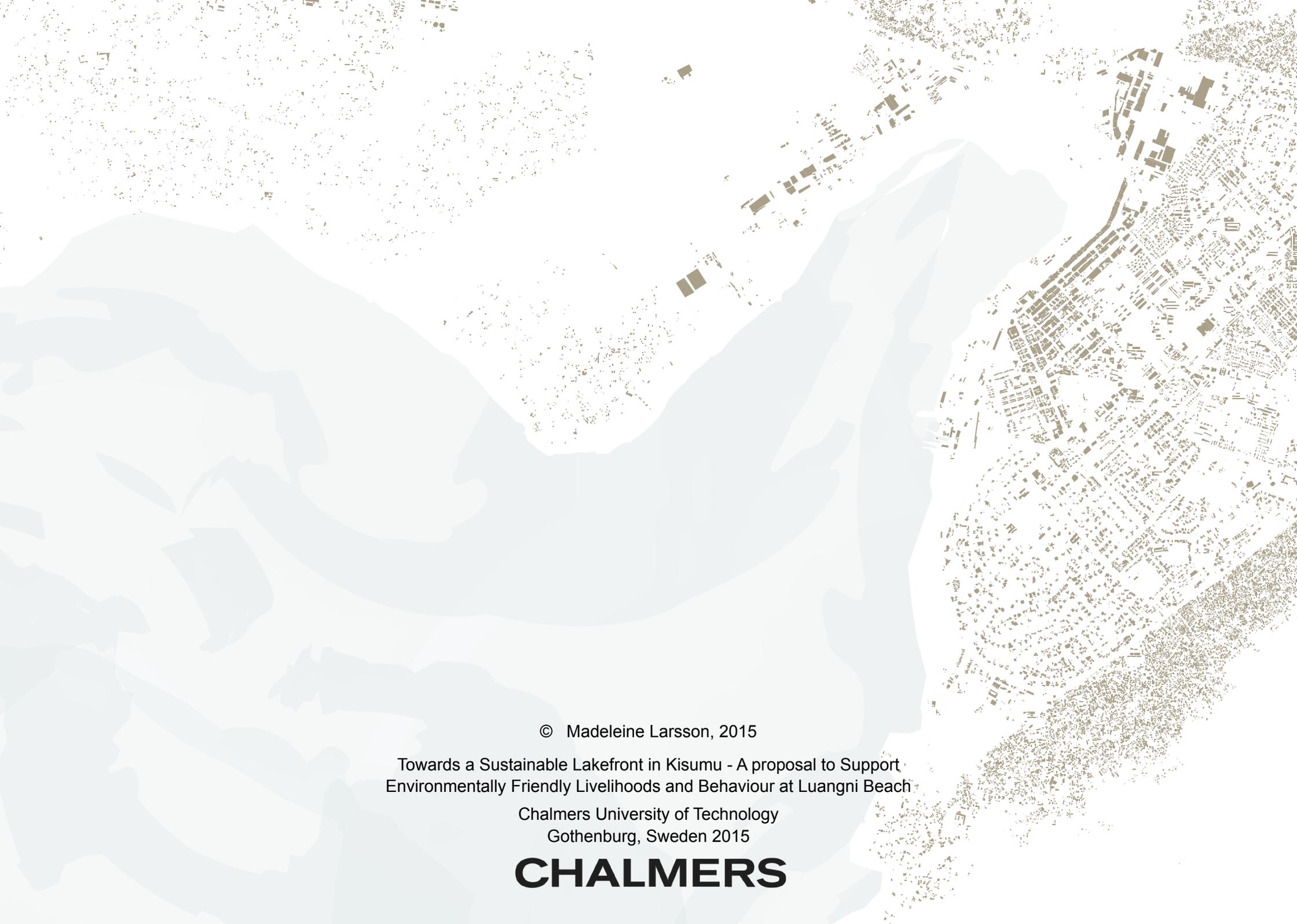
Stanely Munji, Environmentalist/Ecologist working at Impala Park, mars 12th, 2015

Wim Eising, KUP Coordinator, Team Leader of the Technical Assistance Team, mars 12th, 2015

GRAPHICS

All graphics and photos are made by author unless otherwise stated.





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Chalmers University of Technology
Gothenburg, Sweden 2015

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