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*Final Report*

# KEUR MASSAR A LAKE OF OPPORTUNITIES IN DAKAR

## Urban futures workshop

Spring Semester 2019 - May 23rd 2019

Master of Science in Innovation, Human Development & Sustainability  
Master of Arts in African Studies  
Master of Science in Urban Territories



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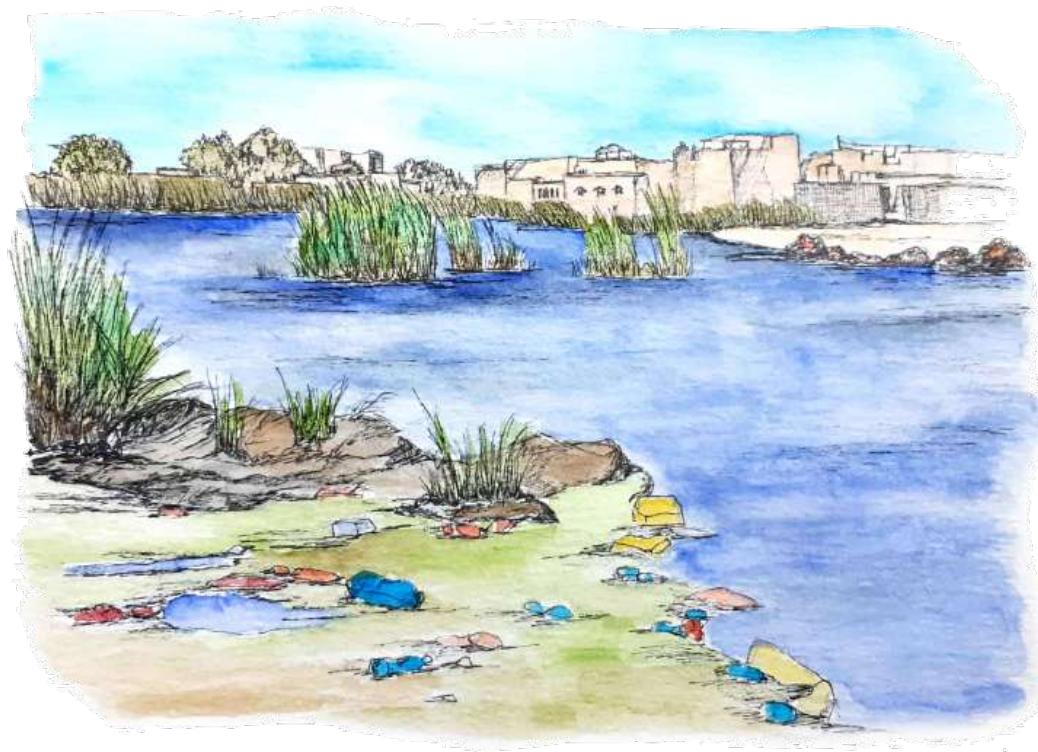
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Innovation, Human Development & Sustainability  
Territorial Development  
African Studies

# INTRODUCTION

## KEUR MASSAR, A LAKE OF OPPORTUNITIES

by

Alex Mackey  
Anna Cornelia Hertgers  
Stephanie Nicol



## **Context**

Dakar, 'a city of extremes': beautiful highways and tiny bumpy roads, central business districts and precarious neighbourhoods, high fashion women and hip hop stars, bright coloured minibuses and so much more. Once a tiny settlement in the South of the Cap Vert peninsula, Dakar is now one of the most rapidly developing cities of Africa, with today a population over 2.4 million inhabitants. Over the last hundred years, Dakar has spread out from West to East over nearly 40 km, where it swallowed up a number of surrounding areas, now covering an area of 550 km<sup>2</sup>. At the same time, it is growing upwards and more densely populated. The historical lack of planning and the eviction of poor inhabitants from the city center has caused a rapid urbanization at the periphery, fed by the flow of migrants from various parts of Senegal or even from other countries in the region, which contributes to the development of informal housing in big parts of Dakar. This lack of planning is the cause of weak basic infrastructure systems, lagging public services and facilities, lack of water and energy disruptions is particularly found in the department of Pikine, which is considered 'the double of Dakar'.

Also, this area faces the emergency of new natural risks. Many informal and precarious settlements have historically been established in areas that were previously humid, but due to the drought of the 1970s to 1990s had dried up. Since 2000, the return of normal rainfall has caused severe flooding problems among the poorest population. Faced with this, the state, and with the help of various international organizations, has begun various

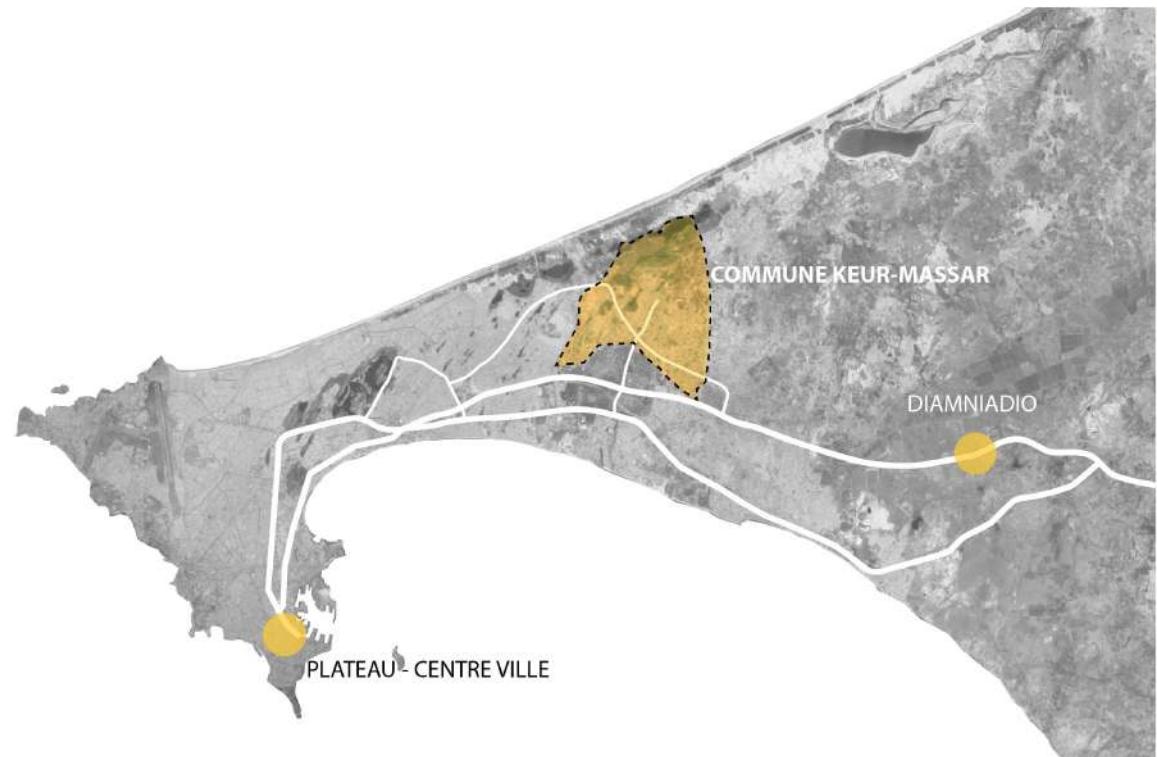
programs of water management. With help of the World Bank, the lakes in the region will be connected to the Mbeubeuss lake, in order to manage the flood risks. Additionally, there is greater strategic planning, an increase in awareness campaigns and the construction of more advanced infrastructure. This urban planning, managing and organizing of the city causes various challenges. During sessions from February to May 2019 and a fieldwork trip to Dakar in April, students of the University of Geneva selected a municipality of Pikine, Keur Massar, as a case study and explored, examined and analyzed the root-causes, dynamics and solutions to these challenges.

Keur Massar is one of the sixteen communes of Pikine. This second largest municipality in Senegal (with a surface of approximately 25km<sup>2</sup>), created by law in 1996, perfectly illustrates an area that can evolve from susceptibility to risk to fruitful with opportunities. It is strategically located between the central business district of Dakar and the smart city Diamniadio, that both attract multinational enterprises and international investments. Due to its attractive location and potential for economic activities, Keur Massar is facing unprecedented growth. Hosting over 590,000 people (about three times the population of Geneva city), the population of Keur Massar is still rapidly increasing and more and more people are centered around the lake of Dekh Bu Mag.

# INTRODUCTION

## KEUR MASSAR, A MUNICIPALITY IN THE CITY OF EXTREMES

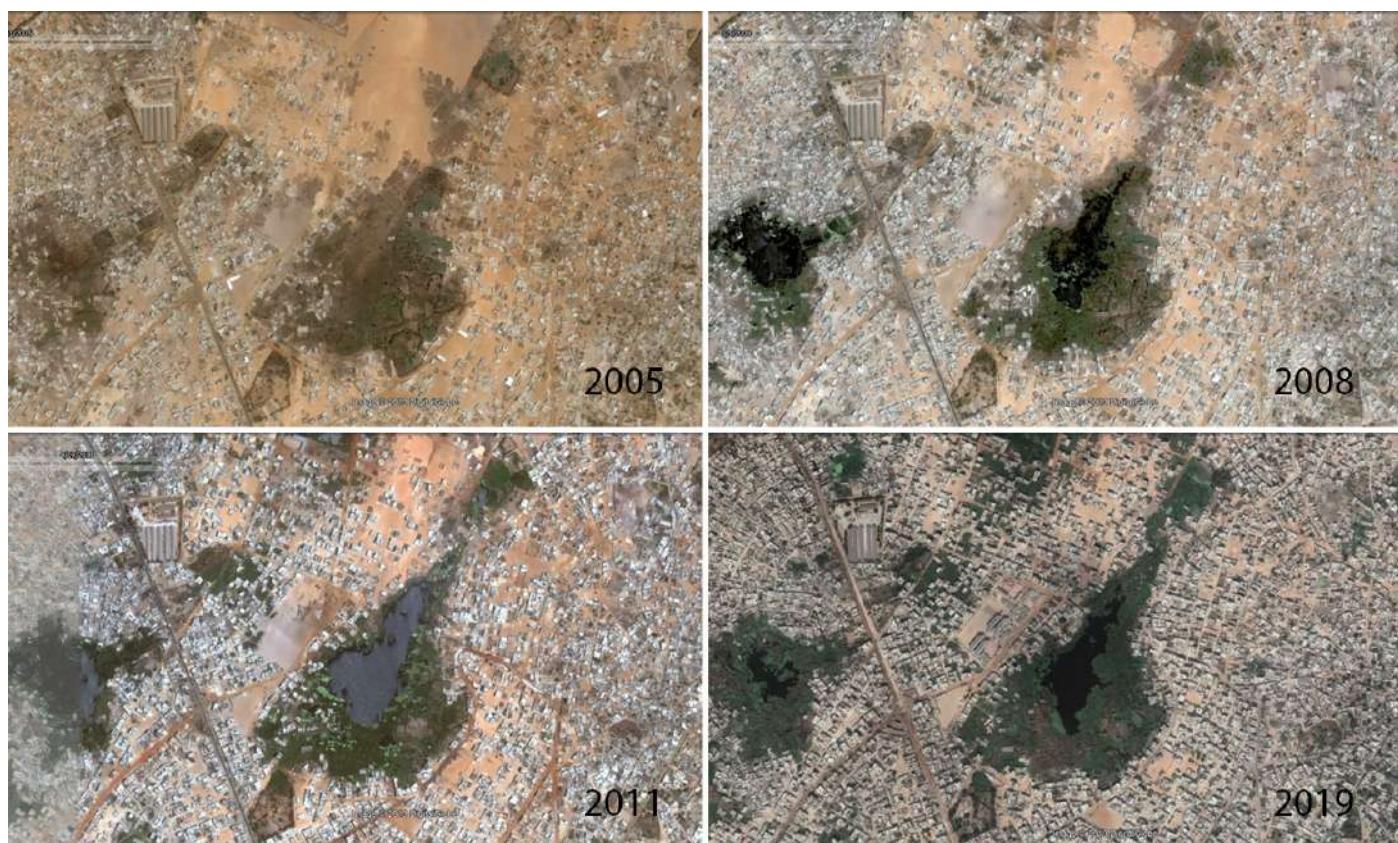
*Context of Keur Massar between the center of Dakar and Diamniadio*



Source: Self production

Context of Keur Massar between the center of Dakar and Diamniadio, and central location of Dekh Bu Mag Lake in the commune.

*Evolution of the wet areas in Keur Massar from 2005 until 2019 (satelite view)*



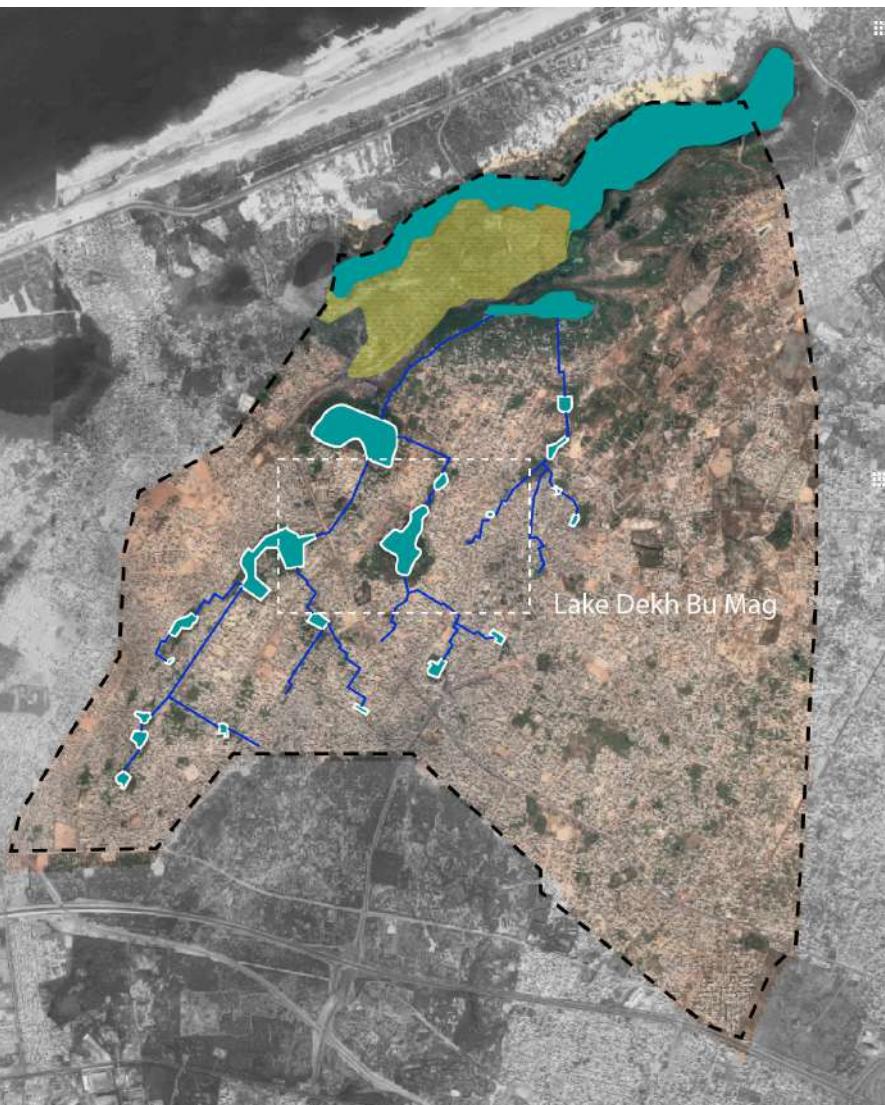
Source: Google Earth

After 2006, many flooding events during the heavy rain season have formed the lake Dekh Bu Mag.

# INTRODUCTION

## KEUR MASSAR, A MUNICIPALITY IN THE CITY OF EXTREMES

Water ponds in Keur Massar and its surroundings (satelite view)



Source: Self production based on WB project

World Bank project for flooding control by securing existing retention ponds and connecting them with underground canals in the commune of Keur Massar.

Some of the main challenges that were established as a result of the fieldwork, showed that with the urban growth, it is hard to ensure that the needs of the population are being met. A large number of people does not have access to formal housing. Regarding infrastructure, we observed that most buildings are no higher than two stories and are usually made of cement. The population seems to live in mostly low and middle income households and there is a high presence of social mixity. Basic infrastructures are not always available; access to water is limited and the waste system does not adequately address the needs of the area. The land around the lake of Dekh Bu Mag and the lake itself have become an open landfill. Most social activities seem to take place in or around the house. Women and children mainly occupy the space during the day which indicate that many children are not going to school, the men are mostly working, many women have no income, as they take care of their household and children. Nevertheless, there is a lack of green, shaded spaces that can be utilized by the population for recreational activities and provides safe playgrounds for children, but also sports facilities are limited. The few existing playgrounds are rare and not ideal for children particularly on hot days as they are made out of metal or plastic and they therefore overheat and become dangerous. Existing sporting courts do not have enough equipment, spaces for spectators to watch a match, nor do players have a fresh space where they can have a brief pause. There are high levels of unemployment, but the numerous capacities of the area have not been exploited. There is a lack of space for women to conduct economic activities and in the meantime the market is not close to a large amount of the population, which limits their economic potential. Around the lake, there are big fields of typha, but the excess amount is not used for economic purposes.

## Key Areas of Importance



### QUALITY OF LIFE

The overall mission of this brief is to craft suggestions to improve the quality of life for the current and future residents of Keur Massar. Economic empowerment, community engagement activities, and sustainable development are all aspects that we are aiming to achieve with our suggestions. With better potential for incoming generation the overall standard of living will be elevated. Community activities are necessary to engage women and youth further in Keur Massar, bringing them together and giving them fruitful ways to spend their time. Housing and buildings should be developed sustainably, taking inspiration from eco-neighbourhood that use renewable energy, local materials for construction, and emphasize the power of living cooperatively to encourage social diversity and collaboration. These aspects in conjunction with one another will help provide a happier and more sustainable life for Keur Massar's residents.



### WOMEN

The aim of our proposal is to empower women so that they can become actors of change and development in Keur Massar. The status of women is often that they are willing to be productive members of society who contribute to the economy, but lack the means to do so. Women often reported that they do not have available space to conduct their activities (such as cleaning agricultural products or making artisanal crafts) and that they are in need of a space for their children while they work. There is also a subset of women who are highly skilled in different areas, but do not have the financial capability to start their businesses. The proposals should therefore consider constructing a space that is readily accessible to women in Keur Massar, provide space for children to stay during working hours, and offer resources to women to kick-start their economic endeavors.



### YOUTH

About 62% of Senegal's population is under 24 years old and so the youth of Keur Massar plays a vital role in the community, representing the potential of future generations. Engaging the youth by providing them with an increased access to skill-building workshops, social and cultural activities, sports, and sensitizing them to social and environmental issues such as sustainability and waste management will contribute to a sustainable growth and prosperity of Keur Massar and an improved quality of life of future generations. Our projects aim to provide boys and girls equal access to the necessary skills for the jobs of tomorrow and offer them the social, cultural and sports infrastructure to improve their health and quality of life.



### WASTE SYSTEM

Our vision is to create a waste system that places greater emphasis on sorting of waste and recyclable products, improve the collection system, decrease the production of waste, and engage the community throughout these efforts. The current system in place mirrors that of the entirety of Dakar: waste is picked up 2-3 times per week and brought to Mbeubeuss, where it is then further sorted into categories such as waste or plastics that can be sold for profit to private companies. The region lacks formal and accessible trash and recycling bins, making it difficult for waste to be removed and for recyclables to be reused or sold. With enormous amounts of waste in the region, this facet provides an opportunity to move from litter that dirties the area to an economic activity to improve residents' livelihoods.



### PUBLIC SPACES

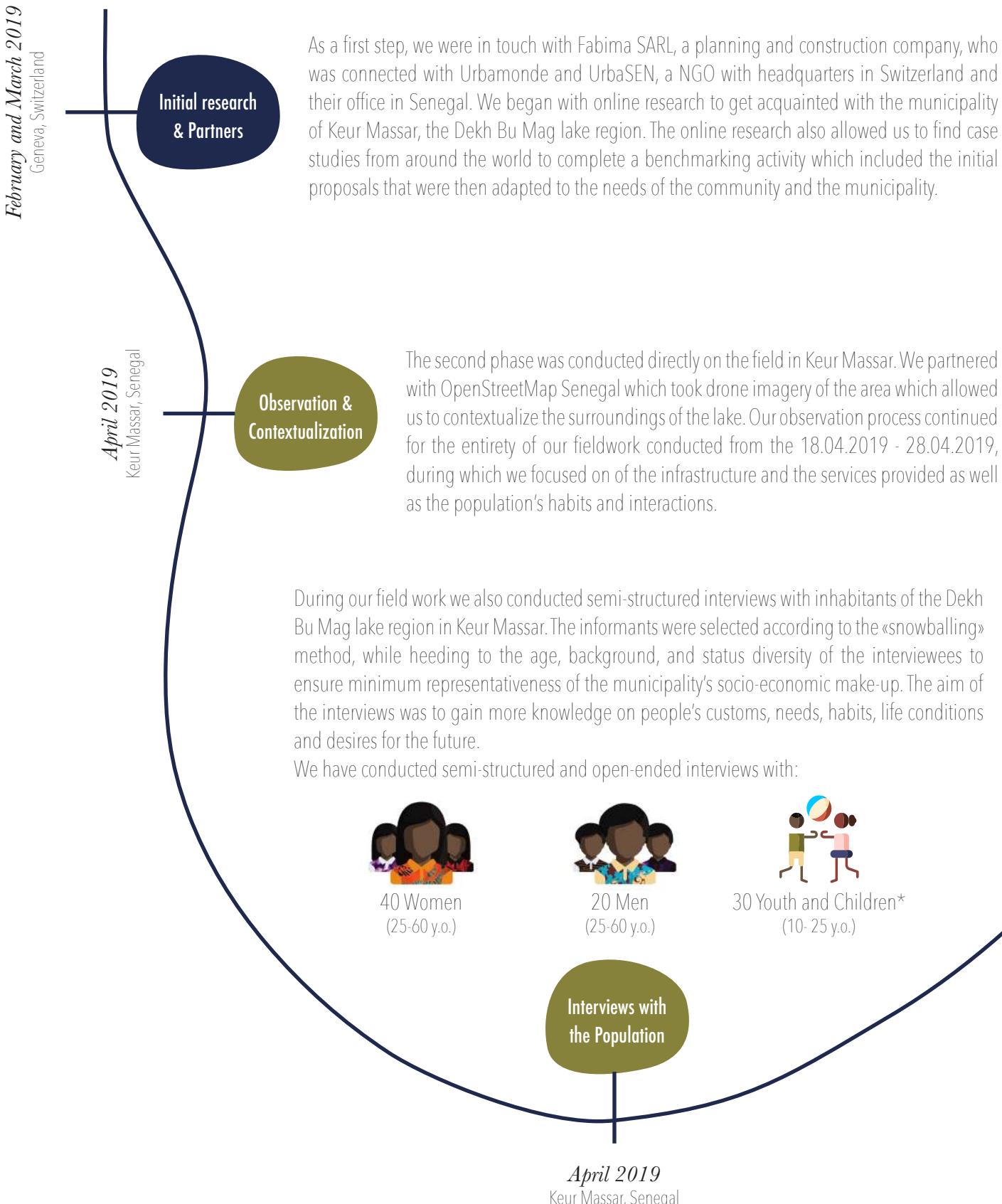
A key facet of the attractiveness of Keur Massar is its vast areas of open spaces that have potential to be utilized by the community. Throughout development of new facilities, this should be considered as it is a major aspect of the lives of the residents. Both children and adults use football fields, the area surrounding the lake, and outdoor areas to pass time. Enhancing the already-existing areas would ensure that residents are satisfied and will attract others to the area as well. These areas can also be developed further to provide educational opportunities, economic workshops, and spaces that are useful to women and children.

# INTRODUCTION

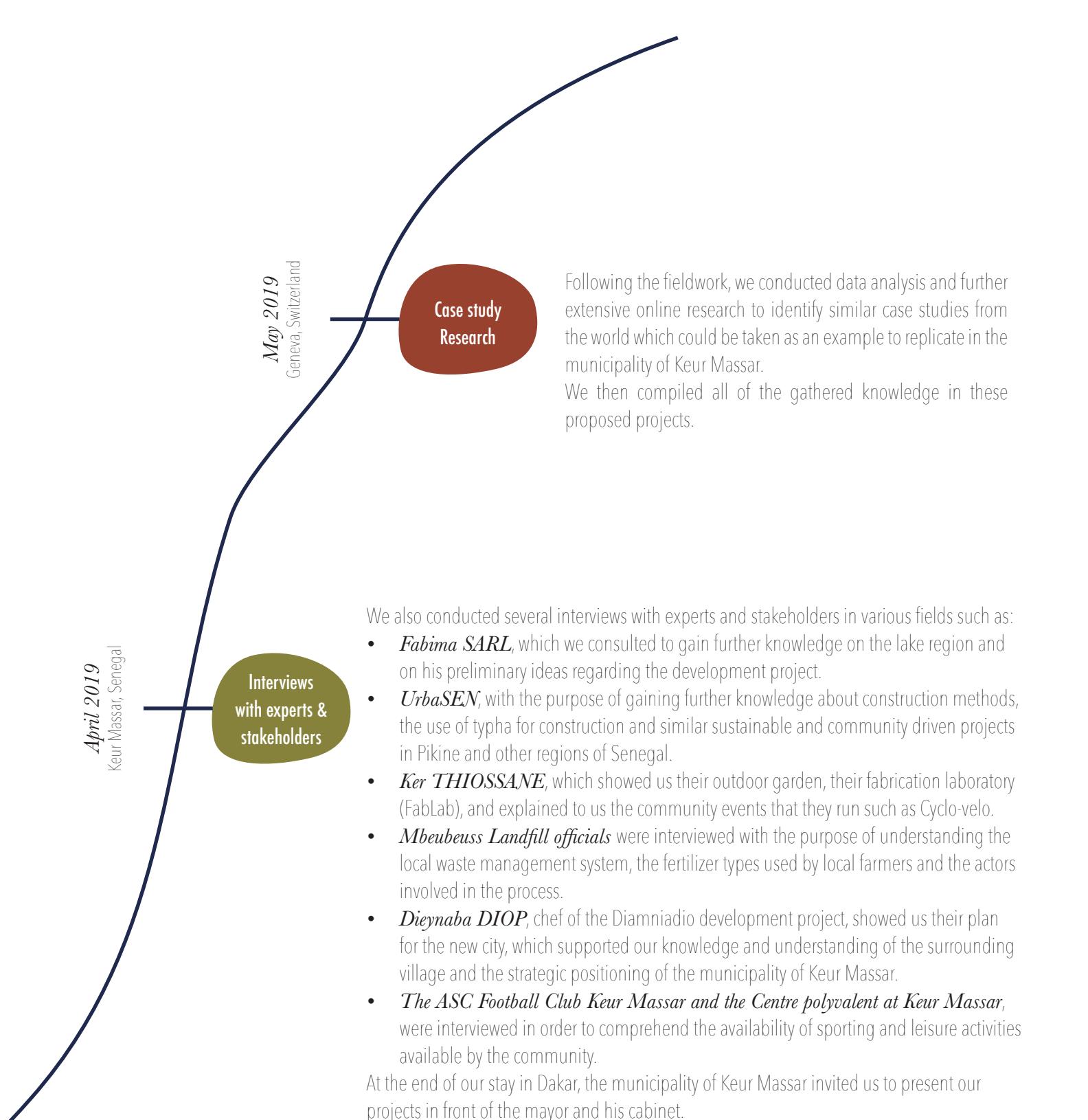
## KEUR MASSAR, A MUNICIPALITY IN THE CITY OF EXTREMES

### Methodology

Our methodological process for the development of the project has been four fold: online research, case study analysis, direct field work observation and semi-structured and open-ended interviews with experts and members of the community.



\*All children were interviewed with parental permission.



We built our projects based on the knowledge that we gained on the field which showcased the needs and desires of the community. This brief aims to provide several project recommendations to address these issues, taking into account the data uncovered during our field work that involved communication with a wide range of people of various ages. Each project includes the main goal, suggestions for implementation, and potential partners that can be contacted to aid in the development of these projects through guidance or even financial support.





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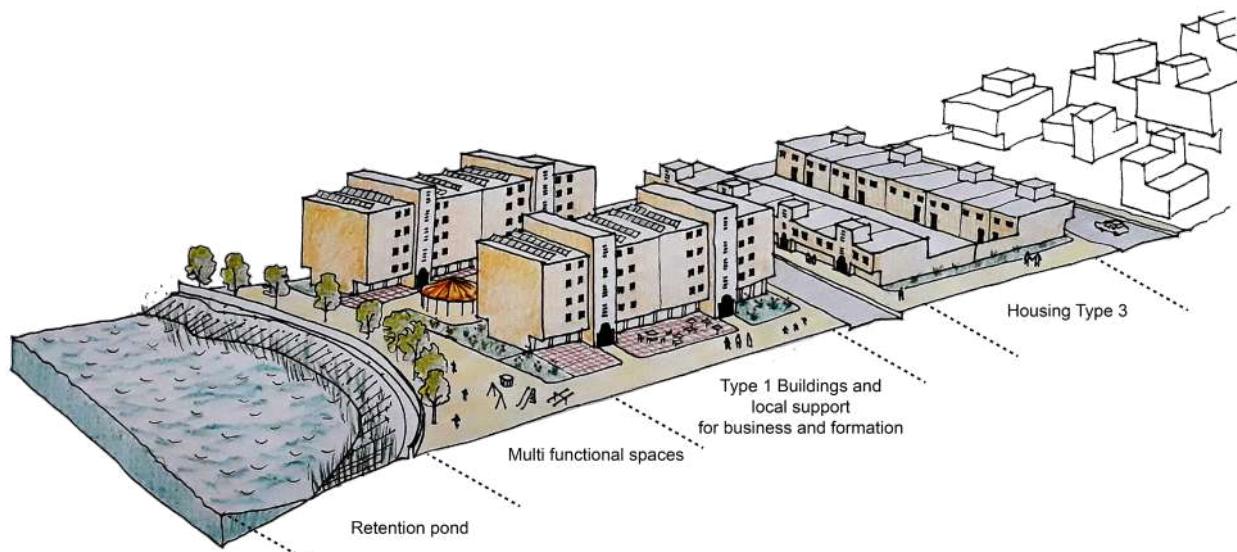
# QUALITY OF LIFE

## ECO-NEIGHBOURHOOD

Propositions by

Alex Mackey  
Leda Tiemy de Freitas Watanabe  
Sebastian Suarez Valenzuela  
Baptiste Fellay

# SUSTAINABLE COMMUNITY PROJECT - A NEW WAY OF LIVING IN KEUR MASSAR



Arrangement does not depict reality, for demonstration purposes only  
Own production



## Objective of the project

Provide a new kind of residential houses, based on cooperative living with sustainable and ecological values, social diversity and support for local business and formation for the inhabitants from Keur Massar.

## Description and operationalization of the project

### HOUSING

There will be three different types of housing offered to the community, accounting for 550 units that will allow for a community with a range of social groups. Our goal is to keep the social diversity existing in and characterizing Keur Massar.

There will be three different type of housing:

#### TYPE 1

A series of apartment buildings of four levels, offering individual plots of 100m<sup>2</sup> or 80m<sup>2</sup>. The ground floor of each building will be used for local commercial and community activities, stimulating the economy and creating a link between residents and their neighbourhood. This kind of housing will be located directly next to the lake.

A series of standalone villas of 200 square meters, targeting families that want to engage in the area with a higher level of privacy. The area will offer an opportunity for community engagement in the heart of Keur Massar and is geared toward middle-income families.

#### TYPE 3

A connected series of 80 square meter villas in a housing cooperative with important values such as solidarity, mutual aid, democratic management, non-profit making, local roots and living together.

The cooperative member status will be between a tenant and homeowner status: members of a housing co-operation do not buy their home, but co-own through their shares. Further, the FSH (Senegalese Foundation of Inhabitants) has set up a savings system that allows members or groups to carry out projects related to their place of life. This type of organisation will help with the management and maintenance of the neighbourhood.

#### TYPE 2

This form of cooperative economy is important because it is one of the means allowing homeownership for households with modest incomes. This while being in a context where they can enjoy a community living environment, have responsibility for the environment and a equal opportunity for all individuals to participate in and influence decisions that affect each of their lives.

# SUSTAINABLE COMMUNITY PROJECT - A NEW WAY OF LIVING IN KEUR MASSAR

## Description and operationalization of the project

### CONSTRUCTION ASPECTS

All buildings will be constructed using local materials and innovative construction systems. They will integrate traditional and vernacular architectonic space dynamics and formal-aesthetic expressions to improve air circulation and reduce the use of air coolants and energy use.

Individual houses (types 2 and 3) will be constructed with reused plastic bottles. The main structure can be made of reinforced concrete while the walls will be built with bottles, in order to follow the principles of constructability, such as those developed by NGO DARE in Nigeria (see picture example below). The process is simple and has many advantages; it is inexpensive, an effective insulation technique in warm countries, durable, and environmentally-friendly, contributing to the waste separation and recycling campaign.



Source: Canal+, 2017

Plastic water bottles have been used successfully in construction in the Western Sahara and Nigeria.



Source: Lelombrik, 2011

The main structure of Type 1 buildings will be reinforced concrete (pillars and beams) to meet greater structural requirements, but will utilize bricks made of ground and typha as well.

### *Manufacture of typha bricks*



Source: Association TypHAS, 2018

Typha bricks have already been developed by UrbaSEN and are used in Diamniadio, providing a sustainable use of a local material.

# SUSTAINABLE COMMUNITY PROJECT - A NEW WAY OF LIVING IN KEUR MASSAR

## Ecopavillon «Terre-typha»



Source: NAMA Architecture, 2019

The project of the Programme national de réduction des émissions GES à travers l'Efficacité Énergétique dans le secteur du Bâtiment Projet de transfert de technologie (PNEEB), l'écopavillon "terre-typha", showcases what can be made with Typha. The building will be the resource center of PNEEB Typha, for example, hosting meeting space and seminar rooms.

## BASIC SERVICES

Electricity will be provided by solar panels on buildings and utilizing the plastic for energy initiative mentioned in the waste section.

An individual local water container system can be developed to bring and distribute water to each building, with collective systems for the individual householders in the quartier.

Waste water treatment stations can generate products for composting or agriculture, in link with the entire local waste management system, with a separate system allocated to connect individual housing to other treatment stations that are linked to the street network.

## MULTI FUNCTIONAL SPACES

The ground floors of Housing Type 1, located next to the lake, would be free for economic activities such as shops, workshops, and areas to conduct business. They will also include a Kindergarten in close proximity to the community center and a medical center to easily access health resources.

A restaurant will be placed at the end of a boardwalk heading to the lake, offering scenic views for customers that will launch the local economy. This restaurant will attract locals and tourists, increasing job opportunities for the local population.

A multifunctional area, attracting different kind of people for various economic and social will be created for use by the community.

The area will incorporate green spaces between structures and a promenade along the lake to maximize the amount of outdoor area that is accessible to the public and residents. Any empty spaces between buildings will be large enough to set a stage for music shows, a screen for football games, or other community activities.

The goal is to create a multifunctional area that attract people for different reasons, where they can meet and spend time, with friends or family, and to turn Keur Massar, strategically located between le Plateau and the new center of Diamniadio, into a new center of Dakar.

## From the field

We conducted interviews with people living close to the lake. We also spoke with volunteers from Urban Sen to better understand the local building system and construction projects, as well as Oumar Sarr (head of Fabima) to provide a template for the housing aspects of the project. General observations were taken of the status of the infrastructure in the area.

There is a lack of secure and furnished public spaces, leaving children to play in the streets. Social diversity was present with different standards of housing, but the majority were still lacking high quality structures.

## Recommended potential partners

### Oolu (electricity)

A start-up based in Dakar who provides solar panels to areas seeking electricity. They have a wide range of options and are well-known in Senegal for providing electricity options to local communities. Liberte 6 extension Nord, Lot N44, Dakar - Sénégal



: +221 338690404

### Access To Water Foundation (drinking water)

This organization works to provide potable water to communities in Senegal by offering a water filtration system. Water is sold for between 0.7 and 1.5 euro cents per liter, which includes the cost of maintenance for the machine and a wage for the vendor who is in charge of the distribution. This helps to create jobs, provide access to water, and reduce water and plastic waste by minimizing the use of plastic bottles and allowing all available water to be used.

Ch. des Fayards 2 1032, Romanel-Lausanne - Switzerland



+41 21 647 11 87

info@accesstowaterfoundation.org

# SUSTAINABLE COMMUNITY PROJECT - A NEW WAY OF LIVING IN KEUR MASSAR

## **Recommended potential partners (continued)**

### **PNEEB (housings material)**

(Programme national de réduction des émissions GES à travers l'efficacité énergétique dans le secteur du bâtiment) : This national programme can advise on the use of typhas as a building material.

Rue Jean Jaurès - 3ième étage - Immeuble KEBE - BP 21 948, Dakar Ponty



+221 33 821 8469

### **3000 ecomen (housing material)**

This NGO based in Senegal is already building houses out of wastes. It could be interesting to collaborate with them for the use of plastic bottles in the building of housings.

Adresse Siège en Europe: 74 rue paul Bert 69003 Lyon

Adresse Représentation au Sénégal: Keur Moussa (Thies) 14° 46' 53" Nord 17° 06' 41" Ouest



laurentlibre@gmail.com

## **To go further**

<https://detours.canal.fr/maisons-plastique-recycle/>  
<https://lelombrik.net/43268>  
<http://typhas.over-blog.com/2018/10/senegal-vers-des-constructions-ecologiques.html>  
<http://nama-archi.fi/prototype-de-demonstrations-utilisant-des-nouveaux-materiaux-terre-typha>



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African Studies

# EQUIPEMENT FOR YOUTH & WOMEN

## COMMUNITY CENTER PISCICULTURE CENTER TYPHA PRODUCTION CENTER

Propositions by

Stephanie Nicol  
Nina Quintas  
Marcelo Gomes  
Maxence Couche  
Hanaé Taxis  
Isabelle Vetterli

## COMMUNITY CENTER

### COMMUNITY CENTER

The creation of a community center for leisure and training activities will promote the needs and interests of the local population. It will host diverse activities related to education, training, social cohesion and inclusion. The space will closely collaborate with associations and NGOs in Dakar and Senegal, in order to offer a comprehensive and efficient services to the inhabitants, in order to offer comprehensive and efficient services to the inhabitants.

Within the community center, multiple projects will be established. First of all, the community center will be a space for entertainment. This means that music, art and dance activities will be provided. Second, workshops and training sessions will be elaborated for the purpose of allowing the community to be empowered and become more autonomous. Thirdly, a farming initiative will be developed, in order to provide a space for the community to acquire farming and composting skills.



# A SPACE DEDICATED TO ENTERTAINMENT

## PROJECT - MUSIC, ART, DANCE, THEATER AND CINÉ-VÉLO



### Geolocalisation on the map

ZONE N°4

Community Center



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



### Objective of the project

The promotion and development of social and cultural activities to foster social inclusion and the promotion of Senegalese culture.

### Description of the project

This space will serve for the promotion and expression of Senegalese culture, through street art, dance, theater and music.

As performance art and dancing are an expression of community building across Senegalese society, the aim of this project is to create spaces where these activities can be carried out in the form of classes, performances and workshops not only for leisure activities, but also as spaces that enhance the professionalization of dance. The project would allow artists to rely on a facility to practice their art, as well as to promote it and transmit it to younger generations. As an open space it will hold the potential to also attract female performers who would have the opportunity to engage in workshops and produce plays and exhibitions.

Many children and young people in Keur Massar enjoy riding bikes. We suggest the implementation of a "ciné-vélo" initiative, whereby the inhabitants surrounding the lake will be able to enjoy the activity of bicycle meanwhile producing green energy to screen films. This event is conducive to the fostering of community bonds, as it promotes art, exercise and well-being as well as environmental awareness. Moreover, it will attract a large range of people residing both in Keur Massar and outside. Finally, inspired by projects implemented by Ker Thiossane (a local NGO based in the heart of Dakar), this activity is expected to generate long-term income opportunities.

Moreover, the space could serve as an area for gatherings where the community could meet and organize events to foster social inclusion and cultural expression.

### From the field

*Traditional senegalese dance practiced by women*



Source: Pinterest, 2019

During the interviews, dance appeared as a great entertainment for local women and youth. Providing a space where they could enjoy from music and dance will be appreciated and greatly used by the local community.

# A SPACE DEDICATED TO ENTERTAINMENT

## PROJECT - MUSIC, ART, DANCE, THEATER AND CINÉ-VÉLO

Proposing this set of activities is grounded in the field-work data gathered in the community, which evidenced lack of space and facilities for developing social and artistic activities for women and the youth. Both groups have expressed a strong desire to pursue music, dance and other cultural activities. For example, instead of enjoying a dedicated space for those activities, young students and pupils are singing, dancing and performing arts in the streets which they feel does not constitute an adequate place for the lack of shade.

All the children riding bikes agreed on the fact that it was for entertainment purposes rather than as a means of transportation prompting the idea of the "ciné-vélo".

### **Operationalization of the project**

#### THE PROJECT IS DESIGNED TO PROCEED AS FOLLOWS

First, a semi-open and shaded meeting area, supported by a metal base structure, will constitute the main facility for hosting the activities. The basic metal structure will be covered with local plants, such as typha and bougainvillea which will provide shade during the day in the dry season when the temperatures can surpass 30 degrees in the sun.

In the rainy season, the activities will take place inside the community center, another structure located near the meeting area. The main room of this community center will completely open through a large glass door, facing the outdoor open and meeting area. In this way one could have a closed or a semi-opened area which could host more people and provide airflow.

#### THE CINÉ-VÉLO FUNCTIONS AS FOLLOWS

To start the cinema, adults and children pedal on the bikes and generate the electricity needed to operate the screen and the sound system. The number of generators is adapted according to the space available and the chosen screen size. For this event, Ker Thiossane can play a key role in the organization and implementation of the project.

*Plant infrastructure to chill-out and for music and dance representations*



Source: Ker Thiossane, 2019

The structure is inspired by the only existing public garden in Dakar's Sicap Liberty 2 neighbourhood, created by the association Ker Thiossane.

#### *Le Vélo Cinéma in France*



Source: Ludik énergie, 2019

To start the cinema, adults and children pedal on the bikes and generate the electricity needed to operate the screen and the sound system. For this event, Ker Thiossane can play a key role in the organization and implementation of the project.

# A SPACE DEDICATED TO ENTERTAINMENT

PROJECT - MUSIC, ART, DANCE, THEATER AND CINÉ-VÉLO

*Traditional drum players in Keur Massar (Djembe)*



Source: S. Nicol, 2019

Playing djembe seemed to be very popular in general among the youth during field work. Having a space where they could gather and play different instruments, especially djembe, is an incentive for the youth to engage in cultural activities.

*Street art seen in Senegal*



Source: Graff et Santé, 2011 ©DR

Street art has a great importance in Senegalese culture and in expression of the youth. It can also be used as a way to inform the local community about specific topics, such as health, sanitation, etc., as it is possible to see on the picture above.

## Examples from elsewhere

### *Ludik énergie*

Rue du Marais, ZI Route de Lorient, 35132 Vezin Le Coquet - France

 +33 09 72 42 18 64  
 contact@ludikenergie.fr

## Recommended potential partners

### *Ker Thiossane*

B.P 10664, Villa N°1695 Sicap Liberté II - Dakar, Sénégal

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 kerthiossane@gmail.com

### *Association Jant-bi | Ecole des Sables*

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 +221 33 836 36 19 / +221 33 836 23 88  
 jantbi@gmail.com



# EQUIPEMENT FOR YOUTH & WOMEN

## PROJECT - TRAINING WORKSHOPS AND COURSES



### Geolocalisation on the map

ZONE N°4

Community Center



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



### Objective of the project

The objective of the workshops offered in the community center is to deliver educational and skills building services for the benefit of the local population, in particular women and youth. This will increase their opportunities on the job market and their social and economic inclusion.

### Description of the project

The community center will offer courses and training on various topics such as languages, waste awareness and management, computer skills and entrepreneurship. The workshops and courses, in accordance with the needs and desires of the population, will be modified each year to provide new, engaging and useful content for the community.

The language courses will provide basic knowledge of French and English to women and youth who did not have the chance to pursue a formal education. The priority will be focused on French and English to drastically improve the opportunities on the job market.

Courses on computer literacy and skills will be provided in accordance with the desires expressed by young people (Microsoft Office packages, such as Word, Excel and Powerpoint).

The courses will either be offered by willful and motivated local people or by external volunteers from local or international universities.

### From the field

The interviews conducted with women and youth of the community, showed that many women, as they were not able to

pursue education, lack some relevant skills that would empower them to pursue a more active economic and social role. A wide percentage of the girls and women we interviewed were unable to speak French while most of their male counterparts had a good command of the language. Lack of language knowledge or other

### *Zero Waste workshop given to children in the municipality of Carouge, Geneva*



Source: Zero Waste Switzerland, 2019

Zero Waste workshops are focused on the reduction of waste production. Raising awareness among children may transform the way they interact and deal with the waste. In long-term, this may lead to the creation of a more conscient generation of consumers.

# EQUIPEMENT FOR YOUTH & WOMEN

## PROJECT - TRAINING WORKSHOPS AND COURSES

relevant skills lead to a decreased access to economic opportunities and social integration.

Many young people are also eager to learn languages and gain computer skills but lack the means to further their education.

### **Operationalization of the project**

The courses will be led by teachers and professors. To maintain affordable costs for the courses, the teachers will be supported by volunteers from various universities around the world for the language courses and basic knowledge of computer skills.

AIESEC, for example, is a worldwide student-run organization, which establishes partnerships with public and private actors across the world and connects them to bright, willful students from around the globe. The students travel to the partners to volunteer for the various needs of the community.

Besides that, stakeholders in Dakar, such as the British Council and the Regional English Language Office (RELO) of the US Embassy, can be strategically engaged with the language classes.

Within the community center basic educational and furniture materials such as chairs, desks, desktop computers, blackboard or whiteboard and writing material.

### **Examples from elsewhere**

#### ***Zero Waste Switzerland***

 Chemin sous le Mont 10, 1116 Cottens VD  
[www.zerowasteswitzerland.ch](http://www.zerowasteswitzerland.ch)  
[info@zerowasteswitzerland.ch](mailto:info@zerowasteswitzerland.ch)

#### ***English Club of Fandene***

More information available on  
 <https://www.learningenglish.voanews.com/a/young-senegalese-turn-to-english/3424762.html>

### **Recommended potential partners**

#### ***Ker Thiossane***

B.P 10664, Villa N°1695 Sicap Liberté II - Dakar, Sénégal  
 +221 33 868 53 09 / +221 77 380 82 36  
[kertthiossane@gmail.com](mailto:kertthiossane@gmail.com)

#### ***UrbaSEN***

261 Cité Immobilière du Golf, Gudiawaye, Dakar – Sénégal  
 +221 33 855 80 03  
[contact@urbasen.org](mailto:contact@urbasen.org)

*Dry toilet in a household in the municipality of Meyrin, Geneva*



Source: Vetterli, 2019

Toilet flushing consumes a lot of water and represents a relevant part of a household water consumption. Dry toilets provide a sustainable alternative to the currently unnecessary use of water.

### **Recommended potential partners (continue)**

#### ***AIESEC in Senegal***

 +221 77 352 17 73  
[aiesec.senegal@aiesec.net](mailto:aiesec.senegal@aiesec.net)

#### ***British Council Senegal***

Rue AAB-68, Amitié Zone B BP 6232, Dakar – Sénégal  
 +221 33 869 27 00  
[information@britishcouncil.sn](mailto:information@britishcouncil.sn)  
 <https://www.britishcouncil.com.sn/en>

#### ***Regional English Language Office (RELO) of the American embassy***

U.S. Embassy Dakar -Route des Almadies, Dakar - Sénégal  
 +221 33 879 40 00  
<https://sn.usembassy.gov/education-culture/regional-english-language-office/>

# EQUIPEMENT FOR YOUTH & WOMEN PROJECT - FARMING GARDENS



## Geolocalisation on the map

ZONE N°4

Community Center



Arrangement does not depict reality, for demonstration purposes only

Illustrated by Anna Cornelia Hertgers

## Objective of the project



The aim of the project is to provide training in both farming and composting to the local households, to generate income, provide an alternative source of revenue and create additional food for families who plant in their garden. Courses on agriculture and composting will use a garden located on the outdoor grounds of the community center, where vegetables will be planted and a compost will be created. The participants will learn specific techniques for planting and composting.

The vegetables grown in the local garden located in the community center will then be sold at the two local markets designed in the Master Plan, and generate a source of revenue to sustain and maintain the center and the workshops.

## Description of the project

The outdoor area of the community center will contain an agriculture field with various vegetables, in the framework of an "eco-farming" initiative. A basic revenue will be provided for the maintenance of the community center by selling the vegetables at the two local markets designed in the Master Plan.

The households will be incentivised to introduce and implement small vegetable gardens, providing complement to their daily food. The farming activities will utilize the local fertilizers produced in the recycling center.

## From the field

We conducted interviews with farmers and women living in the area. There are already-existing agricultural gardens and fields near the lake. Due to the detrimental impact of the salt in the lake on the agriculture, farmers developed composting techniques for their fields. Some people are growing a lot of vegetables such as mint and salad. The project aims to develop the productive initiatives to a broader scale in the area.

## *Local garden in the area of Keur Massar's lake*



Source: Silva, 2019

There are already-existing agricultural gardens and fields near the lake.

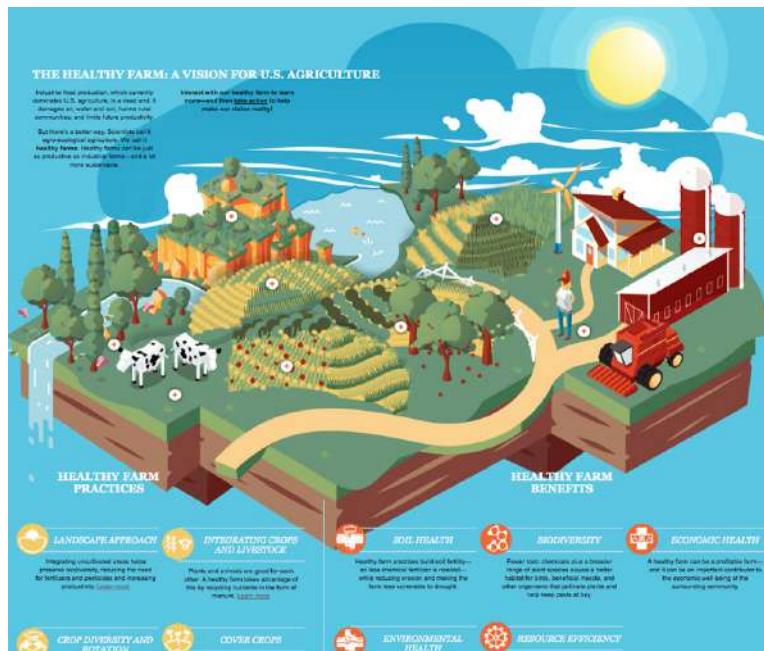
# EQUIPEMENT FOR YOUTH & WOMEN

## PROJECT - FARMING GARDENS

### Operationalization of the project

The trainings will be given by farmers living in the area surrounding the community center. The main costs will consist of the initial provision of seeds, pots and compost, both for the community center to start the vegetable field as well as for households to implement fields at their gardens. These costs will be covered by the selling of vegetables produced in the community center in the two local markets.

### *Eco-farming scheme*



The eco-farming example in the United States provides an excellent illustration of the practices and the benefits of such activity on a community. The benefits include soil health, biodiversity, economic health, environmental health and resource efficiency. The project attempts to apply these practices and benefits to the area in Keur Massar.

Source: Union of concerned scientists 2013

### *Organic compost in the garden of Ker Thiossane, Dakar*



Source: Ker Thiossane, 2019

Composting may be used as an alternative to organic waste. Besides reducing the amount of waste produced by a household, it also allows soil improvement for farming and gardening purposes. It is a multifaceted solution which may even generate income or reduce market expenses.

### Recommended potential partner

#### *Brazilian Embassy*

Boulevard de l'Est, Point E - Dakar, Sénégal

 +221 33 825 94 00

The brazilian embassy conducted a project named "Projeto Paz" which had similar objectives.



## TRANSFORMATION CENTER

### TRANSFORMATION CENTER

In view of enhancing and boosting the value of local resources, we propose the creation of a center for economic activities. The center will focus on job creation and push for entrepreneurship opportunities, while maintaining the local practices of the community, which is rich in resources and ideas. Based on the testimonies collected on the ground, the center will offer the opportunity for citizens to develop technical knowledge, useful for the development of economic activities. This is especially true for the case of women of the area who want to get actively involved in the economy, and make good use of their skills.

Within the local resource transformation center, different initiatives are proposed for the purpose of boosting economic activities in the zone. First, a pisciculture space will be established. Secondly, the community will be able to learn how to use the very abundant resource, the typha, in view of creating handicrafts, to be sold. Thirdly, the center will foster entrepreneurship and small business development by creating mentoring programmes as well informing participants on microcredit and financing opportunities.



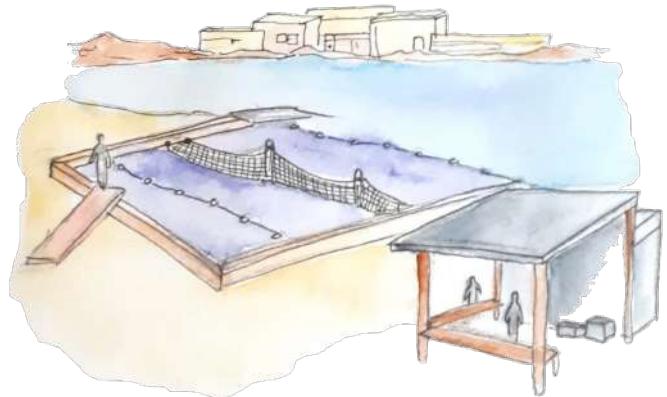
# EQUIPEMENT FOR YOUTH & WOMEN PROJECT - PROMOTING PISCICULTURE PRODUCTION



## Geolocalisation on the map

ZONE N°6

Pisciculture center



Arrangement does not depict reality, for demonstration purposes only

Illustrated by Anna Cornelia Hertgers



## Objective of the project

The lake delivers an abundance of fish. We suggest to create a fish farming activity and utilize the lake's resources in order to promote job creation and economic gains.

## Description of the project

This project envisions that the various communal, public and private actors invest in infrastructure that will clean the lake water in order to ensure long-term, sustainable fish producing activities in a healthier environment. These activities will create jobs for the fishermen and the many women who process fish by drying and smoking it. Moreover, activities focusing on the processing of the farmed fish targeting local women will be organized.

Additionally, the fish can be sold at the two local markets projected at the master plan, fostering the local economy and stimulating business within the area, which will be extremely beneficial for the employment of local population.

## From the field

Several interviews were conducted in the adjacent region to the lake, including:



Landlord, 39

Landlord, 39. He was mainly a merchant, but is involved in many activities. He lives with his wife and 2 kids. They share the house with his 2 brothers' families.

He and his brothers grew up in the neighbourhood, having been witnesses of the emergence of the pond. He states that he was involved in pilot projects for

implementing pisciculture in the pond. He affirmed that the water from the pond even underwent several laboratory analyses in the past to determine whether it was able to host such activities. The results turned out to be positive, but the group didn't manage to obtain the necessary economical resources for the project to be implemented. He however, showed enthusiasm when asked if he would participate in such activity if somehow the project received the necessary funds.



Woman selling fish

Women who sells fish at the local market. She sells vegetables from the local farmers and also fish. According to her, the fish sold in the market are not from the lake.

The water from the lake may not be considered as clean which also makes people avoid to buy and consume it. The wide variety of available fish make the consumers prefer the salty water fish. Other observations show that women are the ones leading the sale of fish in markets but the fishing activities are mainly executed by men. Therefore, the activity of drying the fish may be executed by women.

## Operationalization of the project

Fishing farms require the construction of a pond, which may be built inside the existing lake with plastic, concrete or other materials

# EQUIPEMENT FOR YOUTH & WOMEN

## PROJECT - PROMOTING PISCICULTURE PRODUCTION

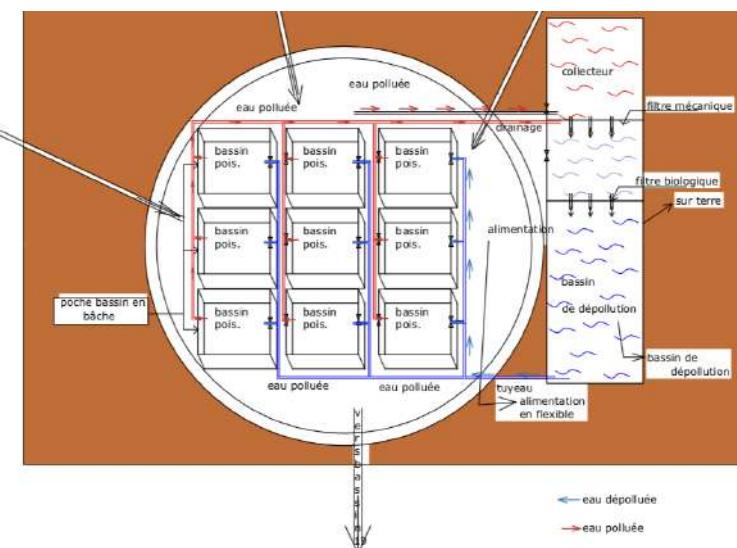
walls around it. It is important to control the water conditions (cleaning, oxygen levels, etc), so a water purifier is needed. The implementation of the scheme proposed by Fabima Company (see image section), which shall be built inside the walls, allows the cleaning of the water through the circulation between the ponds. In addition to a mechanical filter, it also includes a biological filter, allowing a more controlled environment inside the farms. Moreover, the installation of tubes for feeding the fish is also important. The circuit has a double role: making the fish production more efficient, improving the control of the pond and cleaning the water before releasing it back to the lake. Near the fishing farms, women will be trained about processing the fish. Therefore, a room to host the fish drying and smoking process and the training sessions is required.

### Example from elsewhere

#### *Cachar district, in Assam State in North-East India.*

As the local government realized the potentiality and the vast market demand of fishing activities in the region, fish farming business were encouraged. This activity has been developed in the region as a way to earn livelihood. The main challenges faced by fish farmers encompass fish disease, irregular monsoon, occurrence of flood, decrease in rainfall and less growth of fish, which means that the main problems are related to ecology, which should be considered by farmers in Keur Massar. Besides the challenges, the annual production of fish in their farms is considered an important economic activity which guarantees the livelihood of many families (Phukan & Barman, 2015).

### *Fabima water circulation and depollution scheme*



Source: Fabima, 2019

### *Dry and smoked fish from Keur Massar's market*



Source: Silva, 2019

### *Example of a pisciculture infrastructure*



Source: Simply Blue Energy, 2019

# EQUIPEMENT FOR YOUTH & WOMEN

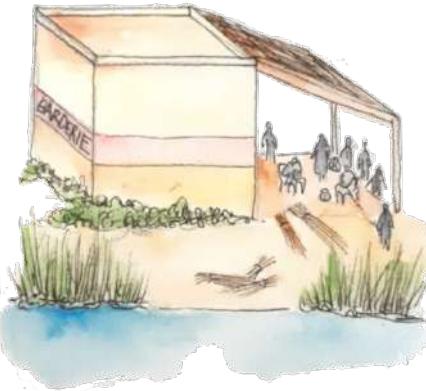
## PROJECT - TURNING TYPHA INTO LOCAL REVENUE



### Geolocalisation on the map

ZONE N°7

Typha production center



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



### Objective of the project

The general goal is to turn typha into a resource for income generation while also preventing the fast proliferation of this type of weed. The project focus is to socially integrate and empower local women. The participants will be provided with know-how through workshops and will be offered the means to exert the activity, with trainings on entrepreneurship. The outcome will take form of handicrafts and low cost construction material for the community center, the market stands and the typha production unit itself - similar projects in Senegal involving typha had this same approach and can be served as inspiration.

The products made can be sold at the two local markets projected at the master plan. Besides, those markets can make use of typha as infrastructure, such as the building of rooftops, walls, nets, etc.

### Description of the project

The workshops will take place in the "Typha Production Center". A number of workshops will be offered to local women in need of an income. The trainings will initially teach the many steps of turning typha into a resource, from the cutting and drying to the making of handicrafts and construction material. In the production center, women will be given the necessary resources to engage in the activity. Meanwhile, the group will also be provided with workshops on entrepreneurship, with the final goal of forming a local cooperative and foster the gain of revenue, training women on the best ways to sell the products and profit. As further steps, typha can also be explored in the making of bricks and energy production (bio-carbon).

### From the field

Information gathered with UrbaSEN about projects using typha as a resource for handicraft and infrastructure. Projects like this were successfully implemented in other regions of Senegal.

Interviews were conducted in Keur Massar with women between the age 25-40. Most women were engaged with commerce activities related to cosmetics or food.

Women in general would like to have a market constructed, so they could have the means to work in commerce and get better revenues with this activity. It was clear the necessity to provide them with means and financing to exert the activities they already work with or would like to.

### Operationalization of the project

The workshops can be delivered by the same experts working in similar projects with Typha in Senegal. UrbaSEN is a very strategic partner when planning the organization as well as providing important contacts. In a first approach, the workshops will be focused on transforming typha into handicraft and simple infrastructure (rooftop covers and walls). The trainings will provide all the necessary know-how, from the process of collecting the typha and drying it, to the making of products. Specific protection

# EQUIPEMENT FOR YOUTH & WOMEN

## PROJECT - TURNING TYPHA INTO LOCAL REVENUE

equipment is required for cutting and collecting the typha, which will also be offered for free to the group (specific shoes, pants, knives, etc).

As a further step, once the trainings are well established, a number of representatives of the local community can be entrusted with the management of further teachings, ensuring the expertise passes to consequent groups of women willing to engage in the activity. As mentioned before, the activities will happen in the Typha Production Center. Typha can be used as a material for rooftops, walls and other necessary infrastructure, as it was implemented in Wakhinane Nimzatt. In that sense, costs will be significantly reduced, making the project very feasible. Once the project has reached an economic return, parts of the profits can be used to the necessary maintenance, making this initiative self-sustainable in the long term.

A very important aspect is the necessary complementary trainings on entrepreneurship, fostering the establishment of a local cooperative of women, an essential aspect for the success of the Typha Production Center. For more information on this, see *Business development and microfinance*.

The handicrafts produced can be sold in the local markets planned in the area and typha can potentially be used as infrastructure for the construction of them.

*Typha production unit in Wakhinane Nimzatt (ground view)*



Source: UrbaSEN, 2019

The activities will happen in a specific building - the Typha Production Center. Typha can be used as a material for rooftops, walls and other necessary infrastructure, significantly reducing costs and, consequently, making the project very feasible.

*Handicraft creation with typha*



Source: Make handicraft, n.a.

Initially, trainings will focus on the process of collecting and drying the typha, further transforming it into handicrafts, such as baskets, purses, etc. Such handicrafts can be sold in local and tourist markets, providing an alternative source of income for the local women.

*Typha production unit in Wakhinane Nimzatt (sky view)*



Source: UrbaSEN, 2019

A similar project was implemented in Wakhinane Nimzatt. The project can serve as an inspiration and important expertise can be provided by the members of this initiative. UrbaSEN is an extremely strategic partner for organizing the activities in the Typha Production Center.

# EQUIPEMENT FOR YOUTH & WOMEN PROJECT - TURNING TYPHA INTO LOCAL REVENUE

## Example from elsewhere

Wakhinane Nimzatt - Senegal. Information available here: <https://urbasen.org/blog/creation-de-l-unite-de-transformation-du-typha-a-wakhinane-nimzatt> (see «To go further»)

Examples from North Senegal, where typha is being transformed into bio-charbon, and in Diamniadio, where typha is being used in the thermic isolation of buildings (see «To go further»)

## Recommended potential partner

*UrbaSEN*

261 Cité Immobilière du Golf, Gudiawaye, Dakar – Sénégal

 +221 33 855 80 03  
contact@urbasen.org

*Cutting typha at production unit in Wakhinane Nimzatt*



Source: UrbaSEN, 2019

People are trained and wear protection to cut the typha. The growth rate is very fast: after about 1 month, typha has already regenerated.

## To go further

<https://urbasen.org/blog/creation-de-l-unite-de-transformation-du-typha-a-wakhinane-nimzatt>

<https://www.arte.tv/fr/videos/079524-000-A/le-typha-nouvel-or-vert-du-senegal/>



# EQUIPEMENT FOR YOUTH & WOMEN

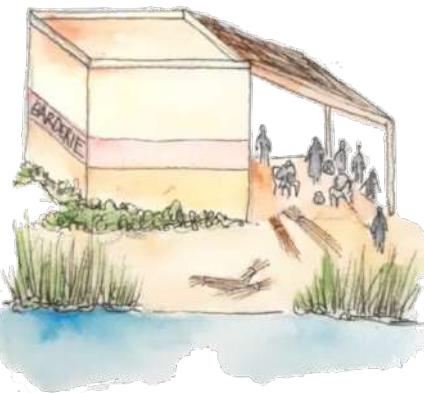
## PROJECT - STRENGTHENING BUSINESS DEVELOPMENT



### Geolocalisation on the map

ZONE N°7

Typha transformation center



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



### Objective of the project

The aim of the project is to tackle the high unemployment levels of the community and empower women and youth to start their own business ventures.

The project's objective is to train local women and young people, by offering different tools to start and run their own businesses such as training and skills building workshops and the creation of a community based economic interest group.

The main goal is to provide assistance to local economic activities developed by women and youth, who sometimes lack the means to continue on such activities.

### Description of the project

The project consists of a two-fold approach.

Firstly, an entrepreneurship course for training women and youth willing to establish their own business will be offered. This will also include classes on the creation of a business plan and financial management.

Some women have been very receptive to the idea of starting their own business and to follow this workshop. However, they showed great concern regarding the financial support needed to develop business and economic activities. For this reason, the financial support system will be based on a Rotating Credit and Savings Association (ROSCA), which consists in an economic business group based in the community center. In Senegal, the system is commonly known as "tontines". The group will advocate for the economic interest and benefits of the members and will also serve a social function. ROSCA meetings can also provide opportunities for networking, interacting and increase trust, hereby fostering a greater community feeling.

### From the field

One of the main concerns raised by the local community, was the lack of jobs availability in particular for women and youth. A number of young people also stated that they want to pursue their own business venture but do not know how to start a successful business. Some of the women interviewed, informed that they possessed certain trainings (cosmetic commerce, food commerce, tailoring, etc.) but the lack of financial support to continue investing on those activities prevented them from proceeding in such activities. It became extremely clear the necessity of offering financial support when providing trainings to the community.

Quote from two 45 y.o. women living facing the lake: "Money would really help our status, it would allow us to do something of our days. But to do that, we need financial support."

### Operationalization of the project

An initial assessment of the local necessities will be implemented in order to understand the main needs in terms of financing and

amount needed. The tutors will then develop a specific strategic planning, adapting the business strategies according to the local needs.

The workshop will take place in the transformation center, where the teachers and/or businessmen will facilitate the courses. This will be followed by the creation of an association of Young and Women Entrepreneurs, which will in turn, come to host the future workshops. The trainings will provide notions on how to successfully develop and maintain a business. Workshops on how to manage finances and how to better invest and expand business will also be provided. The idea is to understand what are the limitations of those who have their own business/commerce in the area, working on how to overcome specific challenges and teaching how to make the business profitable. Besides providing a way of financing, it is essential that the participants learn how to manage the money and how to invest it. That is why the teachings and workshops are as important as the system of financing proposed here.

The ROSCA will be structured as follows: Members of the interest group will pool a predefined sum of their money into a common

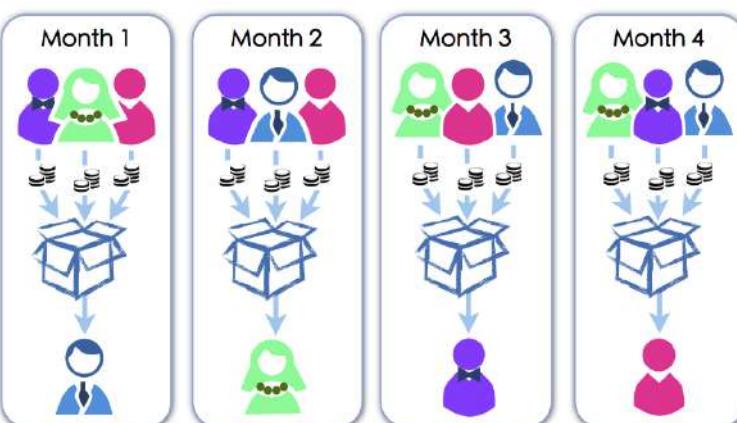
fund, generally structured around monthly contributions. Single members will withdraw money from it as a lump sum at the end of each cycle. The member who will get the money will have to submit a plan of what they intend to do with the sum and the project must be business related. This process will continue for as long as the group exists. For example, six people may agree to give \$10 to a fund every month for six months. Each month, a different member of the group collects the \$50 contributed by the other five members and uses it for their business expenses.

Partnerships with NGOs and social banks could be developed in order to implement microcredits/ microfinance. GRET, an NGO which works in Senegal, has been very successful and competent when providing this type of assistance.

### **Example from elsewhere**

ROSCAs often occur in developing countries in Africa, Asia and South America, and they often go by local names: "tontines" in West Africa, "hui" in China, "njangi" in Cameroon, "stokvel" in South Africa, "tandas" in Mexico, and "chits" or "kuries" in India.

#### ***Rotating Credit and Savings Association (ROSCA) System***



Functioning of Rotating Savings and Credit Associations “ROSCAs”

Source: Systems of Exchange, 2013

ROSCA organizations allow small groups of people to pool their resources for the purposes of saving and lending. They consist of a group of people who agree to make regular contributions to a fund, which is then given to each member in rotation.

#### ***Women count the money for the tontine***



Source: France Culture, 2017

ROSCAs, also known as "tontines" in Senegal, are especially useful for the business empowerment of women who need an initial microcredit to start their small business without falling into great debt.

#### **Recommended potential partners**

##### ***UrbaSEN***

261 Cité Immobilière du Golf, Gudiawaye, Dakar – Sénégal

 +221 33 855 80 03  
contact@urbasen.org

##### ***GRET***

NGO, Professionals for Fair Development

 [https://www.gret.org/countries/africa-indian-ocean/  
senegal-en/?lang=en](https://www.gret.org/countries/africa-indian-ocean/senegal-en/?lang=en)





A work from Master Students in  
Innovation, Human Development & Sustainability  
Territorial Development  
African Studies

# WASTE MANAGEMENT

## COMMUNITY INVOLVEMENT & WORKSHOPS WASTE RECYCLING CENTER

Propositions by

Damla Demirgöz  
Alice Guilbert  
Iris Bouillet  
Adrien Junod  
Randa Ahmed

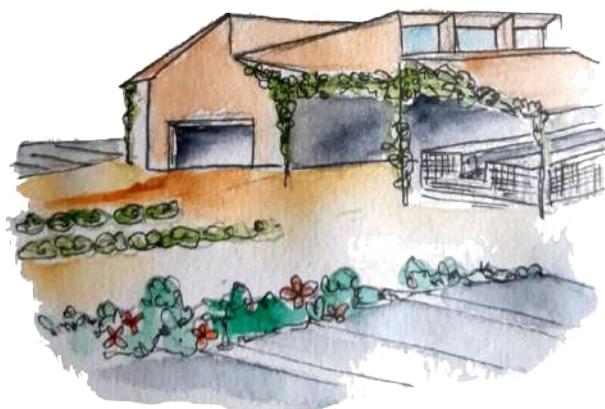
# WASTE MANAGEMENT PROJECT - WASTE RECYCLING CENTER



## Geolocalisation on the map

ZONE N°8

Recycling Center



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



## Objective of the project

This project aims to make the lake area safer and healthier by cleaning it up through a well functioning waste management system. This system will provide more opportunities for economic activities by giving a second chance to the waste by recycling it. The waste will be turned into cheaper fertilizers, everyday-life objects and art to be sold in markets and shops.

## Description of the project

The recycling center will consist of two sections: a section for recycling plastic waste and another one for the compost of the organic waste. The first part of the recycling center will be a 'plastic recycling lab' where plastic will be turned into baskets, toilets pots and art, while the second part of the center will consist of Integrated Resource Recovery Center (IRRC) where organic waste will be turned into fertilizers, which can be used in agriculture, individual gardens and green public spaces.

To facilitate the recycling of the waste, it must be divided in three sections. Therefore three bins will be placed at several locations, where the trash will be divided into three sections: organic waste, plastic waste and other waste. Then, the waste will be collected by small trucks and carriages from each neighbourhoods, where the waste is already sorted. The waste will be brought to the center where the workers will take the waste into two different sections of the center. In here, the waste will be turned into something useful for the locals where they can earn money using and selling the end product. As for the other waste, it will follow the general waste collection system that will take it to Mbeubeuss.

## From the field

Through the process of field work, we interviewed Keur Massar inhabitants, as well as farmers, imams, school employees and officials from Mbeubeuss landfill. The interviewees consist of men and women between the ages of 29 and 65.

In general, poor waste management remains a problem because there is little or no effective infrastructure to enable people to better sort or recycle their waste. Until now, the existing system has been the same: trucks belonging to a private company are collecting the waste deposited at collection points located in the district, and then bring it to Mbeubeuss landfill which is currently managed by the UCG (Unité de coordination de la gestion des déchets solide). As trucks don't pass through small alleys, a carriage system has also been developed to collect waste. However, the latter only concerns people who are able to pay for this carriages service.

Our interviews have shown that the public is aware of the waste issue. Many inhabitants think that their neighbourhood is polluted and unhealthy. Moreover, farmers use water from the lake to water their plantations. This circular dynamic shows that the lake area must be cleaned from waste in order to have clean water supply to get best efficiency from plantations. Most of the interviewees

# WASTE MANAGEMENT

## PROJECT - WASTE RECYCLING CENTER

are ready to change their daily habits on waste to live in a cleaner environment with the help of other locals and the municipality.

An artist that we interviewed mentioned that using recycled plastic for manufacturing would be a great way to deal with the plastic trash while all the farmers were also keen on using organic fertilizer knowing that "chemical fertilizers [were] unhealthy and bad for the environment".

### Operationalization of the project

#### THE 'PLASTIC RECYCLING LAB'

Four machines need to be built: a shredder making flakes out of the plastic waste, an extrusion machine transforming it into a malleable plastic wire, and an injection and compression machine heating and injecting or compressing the flakes into previously build molds. Any types of plastic waste can be used in these machines to produce art and daily-life products. An initial budget of a million CFA will be enough to build these machines, the plastic storage room and the initial molds - with local help of a mechanic or an engineer - as the materials are easy-to-find and cheap and the energy consumption for their use is very low. It needs two people to transform the waste into everyday-life objects - as water pots - or art.

#### THE INTEGRATED RESOURCE RECOVERY CENTER (IRRC)

RRC is using Box Type Composting which built with local resources in a cheap way. This system consist of 5 small sections: reception area, compost boxes, maturing boxes, packaging section and office area. Also, a small garden is suggested to showcase the fertilizers and also provide food to the workers. It takes 4 to 5 days to fill one compost box with 15 tons of waste. Filling all the boxes and starting to receive fertilizers takes 50 days. With the right usage of compost materials there won't be any smell and the organic waste will be turned into a highly nutrient organic fertilizers.

### RECOMMENDATION

The municipality and the private sector should support recycling center financially until the recycled product starts bringing enough income to the center. The items produced in the center should be sold directly in the center as a first step to help the center to function without getting support from the others in the future. Later, these products will be sold in markets and shops. The participation of the municipality is highly important. First, to interconnect the new waste collection system to the existing system. Second, the center needs the help of the municipality to subsidize organic fertilizers that is produced in the recycling center. The goal is that the organic fertilizer would be cheaper than the chemical fertilizer they currently use (300 fr/kg).

### Examples from elsewhere

In Thailand, *Bope Shop* makes for several years ashtrays or pots out of plastic bags, whereas in the UK, the *Happenstance Shop* makes furnitures out of milk bottles.

#### *Example of buckets made in Thailand*



Source: Instagram account @bopeshop, 2019  
n.a.

*Dhaka* in Bangladesh provides a successful example for the recycle of organic waste. Currently they are producing more than 500 kg of compost every day and sell around TK 5.0 per kg. This helped them to decrease the pollution level, decrease to export levels, increased employment opportunities and improved the state of the soil.



Illustrated by Alice Guilbert

### To go further

[https://www.unescap.org/sites/default/files/Operational%20Manual%20Composting%20and%20IRRC\\_FINAL.pdf](https://www.unescap.org/sites/default/files/Operational%20Manual%20Composting%20and%20IRRC_FINAL.pdf)

# WASTE MANAGEMENT PROJECT - WASTE RECYCLING CENTER

*Art and daily life object from the plastic machine*



Source: Happenstance Workshop website, <https://happenstanceworkshop.com/>

*Inside of a integrated resource center and the compost boxes*



Source: UNESCAP, 2012.

This system will be used in Keur Massar to produce fertilizers.

*The four machines used in the “precious plastic initiative”*



Source: Precious Plastic website, <https://preciousplastic.com/en/machines.html>

## Recommended potential partners

*Centre Ecologique Albert Schweitzer*  
Quartier Sud Stade – BP 1559 Thiès- Sénégal  
Coordinateur: Antoine Di Biase  
 senegal@ceas.ch

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# WASTE MANAGEMENT PROJECT - COMMUNITY INVOLVEMENT AND WORKSHOPS



## Geolocalisation on the map

ZONE N°4

Community Center



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



### **Objective of the project**

This project aims to decrease the pollution in Keur Massar by increasing the local awareness and knowledge on waste and recycling. The plan is to inform locals on the new recycling centers and bins, to teach them how to sort household waste through the new bins that are placed throughout the neighbourhood, how to use the new recycling center and its machines, and how to turn their waste into something that they can either monetize or reuse. A further aim is to use the community center as a space to share knowledge and ideas on pollution, waste, recycling and economic activities.

### **Description of the project**

First, a local association will be created to increase awareness on waste issues. It will include volunteers from the neighbourhood, especially youth and women. The inclusion of actors such as the neighbourhood leader is crucial to increase the involvement of the dwellers in this association.

The first task of this association would be to inform the people of Keur Massar about the project implemented on their land, the association and the activities regarding the recycling center and waste management. The information session would be through a door to door system.

The second task would consist of organizing information sessions and events in order to raise awareness on waste sorting and management as well as eco-friendly habits: lectures given by local experts, discourses by the neighbourhood leader, festive and cultural events or advertising campaigns.

The last task of the association would be to organize two types of interactive workshops: one to help farmers move their use of fertilizers towards organic ones; and another one for anyone interested in making art, music instruments and objects used in

everyday life, out of reused plastic within the implemented and opened-to-all plastic part of the waste center. These workshops would be held by local experts, such as farmers already only using organic fertilizers as well as mechanics and technicians who build the Precious Plastic machines.

Moreover, the project will promote education at school. Some of the schools are already giving lectures every week about waste and we suggest increasing the number of schools which give lectures.

### **From the field**

During our field work in Keur Massar we have interviewed men and women from different job backgrounds such as teachers, religious leaders such as imams, artists and residents.

The interviews showed the lack of information on the current project as well as recycling and waste management, however most of the locals we have interviewed showed interest in learning more about decreasing the pollution and waste. They were interested in learning how to recycle and use the end products in their daily life. Also, the locals seemed interested in setting up awareness measures and infrastructure for better waste management.

# WASTE MANAGEMENT

## PROJECT - COMMUNITY INVOLVEMENT AND WORKSHOPS

Some of them even suggested the mobilization of young people from the neighbourhood, while some of them mentioned the importance of the involvement of neighbourhood chief ("chef de quartier") to encourage the population to for a good waste management system at the local level. Most of the interviewees seemed interested in increasing awareness measures and using a new infrastructure for better waste management.

### **Operationalization of the project**

The meetings of the associations, information sessions and workshops will take place in the new community center that will be built in Keur Massar. Moreover, the association will be building a stronger tie with the community by providing them a safe and free space that they can use when they need.

During the first year of the association, the economical support of the municipality is crucial. By investing in the association and its activities, the municipality not only will gain the interest of the locals and will benefit from the decreased cost of healthcare services since a clean neighbourhood will increase the public health. Moreover, most of the interviewees, like the Imam, also emphasised role of the formal actors, that were for instance not covering the whole territory in terms of waste collection. As such, there is a need for a cooperation between the local and private sectors for solutions and community services. However, after the recycling center becomes economically self-sufficient by selling its products, the association may start using this money for the activities.

### **Examples from elsewhere**

#### **TEDCOR**

It is an industry player in waste management in South Africa, which offers a formal training program and is affiliated with the Services Education Training Authority (SETA). They offer two types of programs: induction training - designed to provide community contractors with practical training in running their businesses, covering for instance "zero waste operations" or "environmental awareness" - and formal training - including courses in Small Business Management, Communication in English, Information Management.<sup>11</sup>

*A farmer in Keur Massar comparing organic and chemical fertilizer*



Source: Guilbert, 2019

New organic fertilizers that are produced in the recycling center will be used by farmers and help them to increase efficiency of the crops.

*The self-made fertilizer of a farmer in Keur Massar: horse feces with hashes and chaff*



Source: Guilbert, 2019

# WASTE MANAGEMENT PROJECT - COMMUNITY INVOLVEMENT AND WORKSHOPS

Waste and Gender workshop example from South Africa



Source: WIEGO, 2019

The workshop and information sessions will be implemented in Keur Massar by the new local association on waste and recycling

Children making art and toys using the plastic waste in Uganda



Source: HKStrategiesUG, 2016

The association will organize event to locals to teach them how they can produce daily-life objects and art from the recycled materials

## **Recommended potential partners**

### ***FSH c/o UrbaSEN***

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Aïssata Talla, president



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Territorial Development  
African Studies

# GREEN & LEISURE SPACES

**OPEN SPACE  
FITNESS & GAME SPACE  
SPORT FACILITIES**

Propositions by

Daniela Chávez  
Rebecca Jiménez

## **COLLECTIVE SPACES FOR THE COMMUNITY**

This section proposes the creation of communal areas and collective facilities that respect the environment and give people a place to meet and enjoy themselves. We propose four sub-projects that will complement each other and that will target all sectors of the population, especially women and youth as they seem to lack places to spend time:

- Open spaces
- Playground
- Sport facilities
- Multifunctional courts



# GREEN & LEISURE SPACE

## PROJECT - FOSTERING SOCIAL COHESION THROUGH OPEN SPACES



### Geolocalisation on the map

ZONE N°9

Open Spaces



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



### Objective of the project

To endow the neighbourhood with a central, open and natural space where they can meet, relax and discuss the main issues of the community. This place will be the heart of the open spaces and could give the community a sense of identity and harmony.

### Description of the project

The sub-project is based on the construction of an open and shaded space equipped with public benches and a gazebo out of wood and typha, which will allow its users to be protected from the sun during the hottest hours of the day. The space is meant to be a meeting point at the very center of the complex and that would allow the community to be in touch with nature. It will be next to the playground where the children are and next to the bridge that joins one side of the lake with the other. It will, of course, be accessible to all - families, young people, elders - for a moment of relaxation and a practice of living together. The incorporation of trees and plants will give a touch of harmony and extra shadow to this space as well as keeping the environment balanced.

### Operationalization of the project

We suggest using the existing typha in the lake as a construction material. Typha has proven to be very resistant and can help to refresh the area. It is highly recommended to involve local people in the construction of this space, taking into consideration their observations and needs. The inclusion of people will not only have positive effects the low costs but on the sustained maintenance of the space. However, to spread the awareness about conserving this space is a task to be done. This task could be executed from the community centre, through both formal and informal meetings that will foster debates and discussion with local and national stakeholders.

### From the field

The lack of places to converse and discuss was evident around the area that was visited. During most of the year inhabitants face harsh climate conditions, especially hot weather. They have few opportunities for refreshing themselves and resting with their friends and neighbours. Social activities seem to take place in or around the house.

# GREEN & LEISURE SPACE

## PROJECT - FOSTERING SOCIAL COHESION THROUGH OPEN SPACES

*Refreshing areas for relaxing and coming together. Gazebo with reed covered roof, lapa style in South Africa*



Source: PXhere,n.d.

*Another example of a reed-gazebo, designated for relaxation in Son's Island on Lake Placid | Seguin, Texas*



Source: Lake Placid Island, 2017

### **Recommended potential partners**

*Fablabs (fabrication laboratories):*

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### **To go further**

<https://pxhere.com/en/photo/1022452>

<https://lakeplacidisland.com/>

# GREEN & LEISURE SPACE PROJECT - A PARTICIPATORY PLAYGROUND



## Geolocalisation on the map

ZONE N°11

Playground



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



## Objective of the project

The playground is a place for people to meet, play and interact. It is a family zone for parents and children. The children's development and joy of play is front and center in this space. It has been shown that playgrounds can play an important role in the "physical, social, emotional and cognitive development" of children. Children need a place to explore, interact with other children and improve their motor skills. The playground gives them a safe haven where they can do so.

## Description of the project

The children's playground should be directly linked to the open space, making it a continuation of the space and linking them together to create a place where families can meet and young and old can enjoy an afternoon of leisure. The proposed target group for the playground would be children between 4-12 years.

A list of possible structures to be included in the playground:

- swing sets
- a slide
- wooden tower
- a net to climb up on
- balance beams
- a little garden
- tables, benches and shade (e.g. for eating or doing homework)

## From the field

Children have a considerable amount of free time, with little recreational activities that can offer them secure entertainment. Playgrounds are rare and existing ones are not ideal for children

as they are made out of metal or plastic in their majority, which renders them unusable for most part of the day due to the extreme hotness of the facilities.

## Operationalization of the project

We propose a playground built using a participatory approach. A community committee would be involved in the designing and building of the children's games. The playground would be made as much as possible of recycled and sustainable components. Thus, materials from around the neighbourhood could be reused for this purpose. An example might be old tires, which make a suitable base for many different playground structures. This reduces the costs of the enterprise, making it a low-budget project. Inspiration for this kind of playground can be gained from the website Playground Ideas, which focuses on simple "do-it-yourself" playgrounds that can be created through recycling and minimized costs (see examples section below).

Next to sustainability, the prevention of injuries needs to be given due consideration. Apart from the common safety precautions, we propose structures mainly out of wood and nets as they do not heat

# GREEN & LEISURE SPACE

## PROJECT - A PARTICIPATORY PLAYGROUND

up during the day. This prevents burnings and invites children in. For the ground we propose sand as it is readily available and soft in case of falling. Vegetation, like trees and typha, should also be part of the project to give shade and to allow the children to come touch with nature. Finding the right balance between adventure, nature and "classical" playground element, should be up to the community. However, we propose to include climbing and balancing equipment as they help with children's development.

*Example of participatory playground in Dakar*

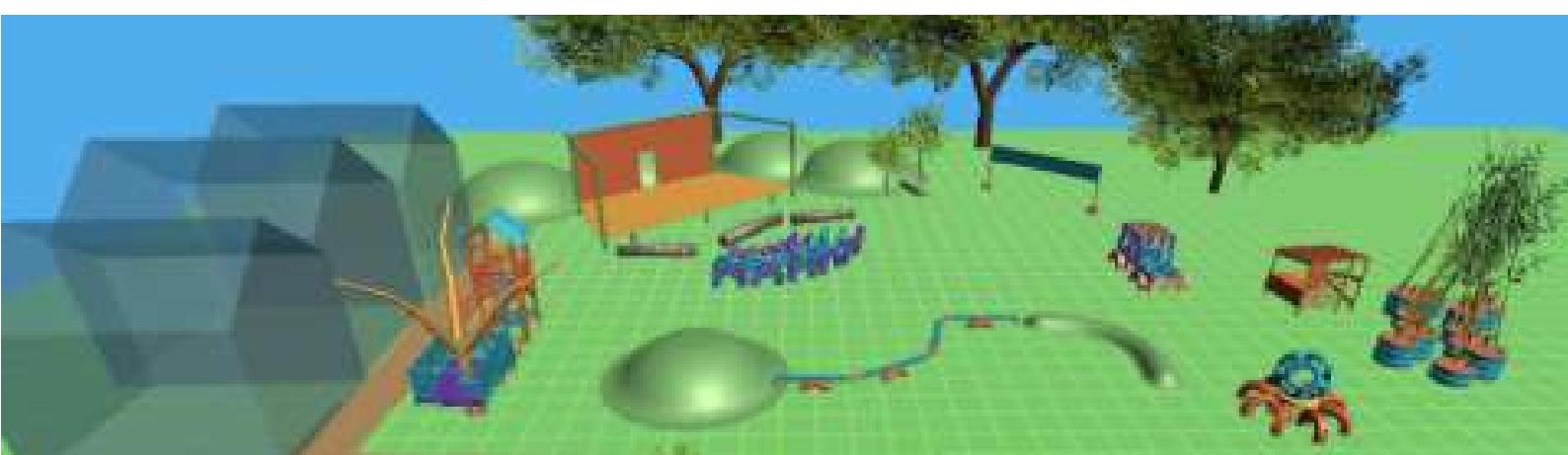


This playground in Dakar was done by an Organisation Communale de Base (OCB named TAKKUTEKKI), which used a participatory approach like proposed above. While we propose a space with more shade, it is an excellent example for a working project where the community - mostly women - are involved in the upkeep. They close down the gated playground in the night, take care of its little garden and keep it clean. The project costs were low amounting to 1300 Euros.

Source: UrbaSEN, n.d.

### Examples from elsewhere

*3D design like this one can be done on the Playground Ideas Website to help envision your future playground*



The website Playground Ideas ([playgroundideas.org](http://playgroundideas.org)), which can be accessed for free, gives detailed instruction manuals on how to build these constructions and might be able to help fund projects like this.

Source: Playground Ideas, n.d.

*Idea of how a Playground Ideas arrangement could look in real life*



Source: Playground Ideas, n.d.

### **Recommended potential partners**

#### *Jokkolabs*

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 contact@recuplast.org

#### *Playground ideas*

 www.playgroundideas.org

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# GREEN & LEISURE SPACE PROJECT - FITNESS AND WELLNESS OUTDOOR GYM



## Geolocalisation on the map

ZONE N°11

Fitness



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



## Objective of the project

The fitness area would be similar to the playground in the sense that it should be a place for people to meet and interact. People would go there in the morning and evenings to exercise, keep healthy and strengthen their community bonds over outdoor fitness.

## Description of the project

The fitness area will be situated at the lake shore and connect to the promenade, which can be used for jogging or leisurely walks around the lake. The equipment should be usable for every age group (13+) and allow a balanced, healthy, structured physical activity at different stations.

## From the field

Young men and women would like to have a place to work out. When asked about it, it became clear that the popular and vast outdoor gym at la Corniche was very widely known and liked by the people.

## Operationalization of the project

While this project should be made of sustainable and recycled material as much as possible, like the playground, it is of the utmost importance that the equipment is of good quality and will withstand the exercises done on them, the sun and the sand. In contrast to the playground, where we suggested materials that do not heat up easily, we recommend using steel for these equipments. There is no alternative material and while it will not be usable throughout the day, it will be durable. Moreover, caution is advised anyway when

working out at too high temperatures or with faulty gear. There should be explanations and pictures on the machines to ensure correct usage. The importance of proper equipment makes this project more expensive than the playground.

A list of possible structures to be included in the fitness area:

- Cardio Walker
- Leg Press and Extension
- Chest Press
- Balance Board Station
- Racks for Chin ups, etc.
- An area clear of sand for push ups, etc.
- Specialist (doctors, nutritionists or physicians)

# GREEN & LEISURE SPACE

## PROJECT - FITNESS AND WELLNESS OUTDOOR GYM

### Examples from elsewhere

*Modell FitCity & Modell Training Circuit*



Two possible setups for an outdoor gym in Keur Massar.

Source: GameTime, n.d..

*La Corniche IFAN, Institut Fondamental d'Afrique Noire et the University Cheikh Anty Diop*



La Corniche IFAN is a popular place for young people from Dakar to work out. This could be replicated in a smaller scale at Keur Massar

Source: Choplin, 2019

### Recommended potential partners

*Fablabs (fabrication laboratories):*

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### To go further

<https://www.gametime.com/products/training-circuit>

# GREEN & LEISURE SPACE

## PROJECT - MULTI-SPORTS FACILITIES FOR THE WELLBEING OF THE YOUTH



### Geolocalisation on the map

ZONE N°10

Multi-sports facilities



Arrangement does not depict reality, for demonstration purposes only  
Illustrated by Anna Cornelia Hertgers



### Objective of the project

The facilitation of two sport courts aims not only at providing the youth with leisure activities, but at forming part of the social fabric. With spaces to practice a sport, young men and women will be able to develop physical skills, share a space of healthy competition and value the space as theirs. Constructing multifunctional sports courts will allow youth, especially young women, to practice the sport that suits them best - following our research this is often handball. In the end, this is part of the social process of women's empowerment, giving them the means to be active physically, to have their own space to practice and also a space where the community can watch them play and support them.

### Description of the project

We are proposing two sports fields, one for football, a sport more practiced by men and a second multi-purpose field for handball and other activities (like basketball, volleyball and others), which might animate young women in the area to play more sports. These two sports fields can be transformed into space for cultural events counting both with shadowed grades.

The two fields will be in different parts of the area to allow easy access to them from different locations and so that both men and women are encouraged to practice a sport. By keeping the courts apart, girls might be attracted to claim the second field for themselves.

### From the field

Sports were among the main activities played by the young, especially football among young men and boys and handball among women and girls. Existing courts do not have enough equipment, spaces for spectators to watch a match, nor do players have a fresh space where they can have a brief pause.

### Operationalization of the project

The proposed material to be used for the second field is cushion (Delta Projects, 2011) for its availability, but Polypropylene plastic made out of rubber is also highly recommended, as it is a cheap and lasting material.

The "main" sport will be handball but other games' lines will be outlined as well. The field will be measuring 40 x 20 m. The football field can be on sand to keep costs low. We propose standard measures (90mx45m) and standard equipment (delineation of field e.g. with tires, goal, etc.). There will be a low cost for maintenance, with both courts easy to maintain. They will be safe and thanks to their strategic location within the neighbourhood, will not disturb other neighbours.

This sub-project is thought to be developed jointly with existing other organizations like: The Keur Massar Football Association, and possibly to obtain a grant from several other organizations like Global Sports Development, Beyond Sport, and Dream Sports Africa.

# GREEN & LEISURE SPACE

## PROJECT - MULTI-SPORTS FACILITIES FOR THE WELLBEING OF THE YOUTH

Even when both courts are low maintenance, it is suggested that at the time of construction, a communication strategy is set out for calling the neighbourhood to take care of it. It is also highly recommended to build a partnership with the local teams and sport associations (mentioned above).

### Examples from elsewhere

*Example of small-sized outdoor game courts are embedded into public housing estates across the city, Singapore*



Source: Sportify, 2018

### *Multifunctional sports field by Delta Park*



Two possible setups for an outdoor gym in Keur Massar.  
Source: Delta Park SRL, 2019

### Recommended potential partners

*Keur Massar Football Association, SENEGAL BP*

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<https://footballacademiemassardieye.footeo.com/contact.html>

*International Organizations, Global Sports Development*

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A work from Master Students in  
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Territorial Development  
African Studies

# MASTERPLAN

**QUALITY OF LIFE  
EQUIPMENT FOR YOUTH & WOMEN  
WASTE MANAGEMENT  
GREEN & LEISURE SPACE  
AGRICULTURE**

**Propositions by**

Julien Boesiger  
Catalina Crisóstomo  
Hussein Dib

## LOOKING AT THE GREATER PICTURE

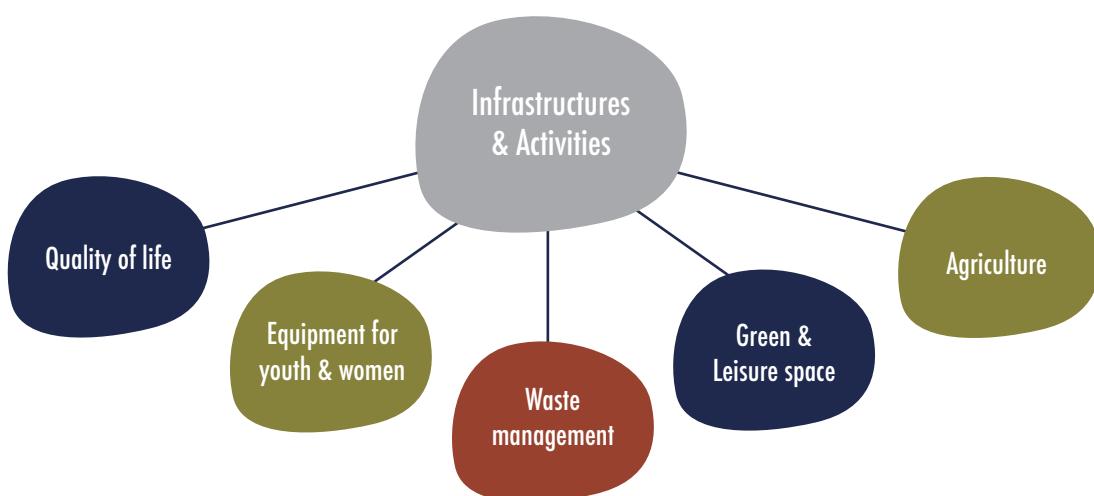
### LOOKING AT THE GREATER PICTURE

Strategically located between Dakar's older city-center and the fast-emerging urban terrain of Diamniadio and the new Blaise Diagne airport, the municipality of Keur Massar is an ideal place for imagining a new way of life.

The overall vision integrates the various project propositions detailed thus far through a broader Master Plan that delineates the exact locations where each activity, open-space and new structure will be built within the direct vicinities of the Lake of Dekh Bu Mag. The Master Plan presented here creates an entirely new neighbourhood in the heart of Keur Massar and seeks to turn an undervalued wet area into a place of multiple economic, artistic and social-bonding opportunities.

Specifically, this urban area promotes sustainable housing schemes, production and entertainment facilities, an eco-friendly urban lifestyle, as well as an improved and innovative set of connecting infrastructure including a bridge, multiple open spaces, and natural pathways. In short, the Master Plan aims to fulfil four guiding principles:

- To ensure significant improvement of the community's quality of life while preserving this uniquely diverse natural environment they inhabit. In so doing, the overall Master Plan places the Dekh Bu Mag lake and its immediate surroundings as the driving force of socio-economic revival and prosperity for its residents and beyond.
- To design collective spaces, socioeconomic equipment, agriculture and new housing units (the eco-neighbourhood) that will strengthen social cohesion across the community and improve its well-being.
- To ensure these communities hold a pivotal place in the connective tissue and city-life of Keur Massar as they manage and maintain the new facilities, spaces and activities.
- To protect and preserve the lake's natural environment.



# MASTERPLAN

## MASTERPLAN

*Masterplan: Designing a new Dekh Bu Mag lake*



### LEGEND

#### ● **Quality of life**

1. Eco-neighbourhood's buildings and equipment
2. Eco-neighbourhood's houses
3. Mosque

#### ● **Equipment for youth & women**

4. Community center
5. Market
6. Pisciculture center
7. Typha Production center

#### ● **Waste management**

8. Recycling center

#### ● **Green & leisure space**

9. Promenade
10. Sport facilities
11. Fitness and game space

#### ● **Agriculture**

12. Existing agriculture area



### **Quality of life**

The overall project aims primarily at improving the living standards and well-being of both Keur Massar and Dakar's residents. This will be done by erecting new sustainable housing units within the eco-neighbourhood.

In order to guarantee social diversity, the eco-neighbourhood will comprise two types of housing. The first one is high-rise buildings (1) and the second type is individual dwellings (2).

For wealthier residents, the high-rise buildings (4 floors maximum) will be built by the lake shore. The main guiding idea is to concentrate the main equipment and public spaces around the lake. High-rises also allows for ground-floor spaces that will host economic activities and services.

The individual houses on the other hand, will be built throughout the neighbourhood and provide affordable housing for lower-middle class families. The new eco- neighbourhood plans for the construction of a mosque (3) situated in the middle of a housing zone.

### **Equipment for youth & women**

The project engages in transformative processes that will effectively change the challenging economic situation that affect women in the region, impinging upon their ability to make a decent living. In addition, the Master Plan offers dedicated spaces for young boys and girls so they can meet up, work, and engage in social and recreational activities. Designing such a place will foster children's development and at the same time create leisure opportunities for whole families.

Specifically, this set of infrastructure is concentrated around the lake and creates an East-West commercial axis, bridging both sides of the lake. Next to the schools, there will be the Community Center (4) where young people go to after school. While the youth engage in artistic and recreational activities, the community center's farming garden will ensure agricultural training to the community and women in general.

The commercial axis will be comprised of a market (5) located near the schools, marking the entrance to this new space. Across the lake, is the Pisciculture Center (6) and a Typha Production Center (7). In this area, the people, especially women will have a space to develop new sources of revenues, with the typha, raw materials, fishing, etc. Finally, at the end of the commercial axis, there will be another market (5) next to the women's area, adapted for them to come and sell their finished products directly to customers.

# MASTERPLAN

## MASTERPLAN



### **Waste management**

The aim of this project is to protect the natural environment of the lake while educating and creating economic opportunities for the local community. The waste management system is designed holistically. It will transform organic waste into fertilizers to be used in agriculture, and plastic waste that could be recycled and turned into new products with added-value to be commercialized in the economic venue of the project.

A Recycling center (8) will be located in the outskirts of the neighbourhood, to maintain a certain distance of the lake and the social equipment, in order to not disturb the activities that will be held in the area. The center is also close to one of the main streets of the neighbourhood which would provide a proper in-out access for the logistics of the center. This facility is also located next the agricultural area, in order to be close to the main generator and user of organic waste.



### **Green and leisure space**

The Master Plan establishes several open spaces designed to promote leisure activities and social interactions while many cities around the world have often prioritized its built infrastructures over green areas.

Like it was said before, the equipment and the space public will be concentrated near the lake, to work like a buffer between the natural environment and the housing area. In this way, the project will preserve the natural environment, and maintain the lake and the equipment as a space for sociability and sharing of the community. The activities held in this area will serve as a connector between the people and the nature.

Along the lake, we will find a promenade (9) for walking and enjoying the space. Several infrastructures offering many activities will take place in this new space. First, we will find multi-sport fields (10) with activities such as football or basketball for men and handball for women. These fields can also be transformed into a festive space for special occasions.

Fitness areas for the adults and Game's areas for the children (11) will available in different places near the walking area and the houses. The space is accessible to all ages.

# MASTERPLAN

## MASTERPLAN



### Agriculture

The project will take into account the pre-existing social and economic activities that occur in the area and make it permeable with new roads to integrate in the new neighbourhood. The existing agriculture (12) will be redefined in order to enable pedestrians to walk through the agricultural area, and in this way contribute to the generation of new leisure green spaces. This will also contribute to the economic development of the agricultural area, since pedestrians will have access to a wide variety of products produced in the area. Moreover, maintaining the actual location of the agricultural area is strategic due to the proximity to the local economic venue of the neighbourhood, which will facilitate the transportation and commercialization of products.







*A work from Master Students in  
Innovation, Human Development & Sustainability  
Territorial Development  
African Studies*

# JOURNAL OF EVENTS

## FIELD TRIP IN DAKAR

by

Leda Tiemy de Freitas Watanabe

## JOURNAL OF EVENTS

### JOURNAL OF EVENTS

On the following pages you will find a selection of pictures that summarize our stay in Dakar. They present the different stages of the project, as well as the people who helped us develop it.



# JOURNAL OF EVENTS

## DISCOVER OUR TRIP TO DAKAR

*19 April 2019*

Visit to UrbASEN and discussion with their project lead, Papa Ameth Keita.



*19 April 2019*

Visit to Diamniadio and meeting with Dieynaba Diop, the head of the Urban project, Délégation aux pôles urbains de Diamniadio



# JOURNAL OF EVENTS

## DISCOVER OUR TRIP TO DAKAR



*20 April 2019*

City tour with Mouhamadou Diene (Urban planner, G2 Conception, Ouagadougou, Burkina Faso) and Fatou Dieng (Urban planner, Keran Group Dakar)



*21 April 2019*

Visit to Gorée Island

# JOURNAL OF EVENTS

## DISCOVER OUR TRIP TO DAKAR

*22 April 2019*

First visit to Dekh Bu Mag lake,  
meeting with locals



*23 April 2019*

Presentation of our first ideas for the project to the  
mayor of Keur Massar



*23 April 2019*

First day of field survey

# JOURNAL OF EVENTS

## DISCOVER OUR TRIP TO DAKAR



*26 April 2019*  
Presentation of our project to the  
municipality and Fabima



*25 April 2019*  
Finalising our projects at Espace Thialy



*24 and 25 April 2019*  
Field work: interviews and observations



JOURNAL OF EVENTS  
DISCOVER OUR TRIP TO DAKAR



Group picture after project presentations  
Municipality members and students from Cheikh Anta Diop University

# ACKNOWLEDGMENT

## WE WOULD LIKE TO THANK & EXPRESS OUR GRATITUDE TO

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