

# DESIGN WITH NATURE

DESIGN CONTEST  
CATALOGUE  
2021

 Co-funded by the  
Erasmus+ Programme  
of the European Union

 BUILD'S  
building urban intelligent living design solutions

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CHALLENGE

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# DESIGN WITH NATURE

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CATALOGUE  
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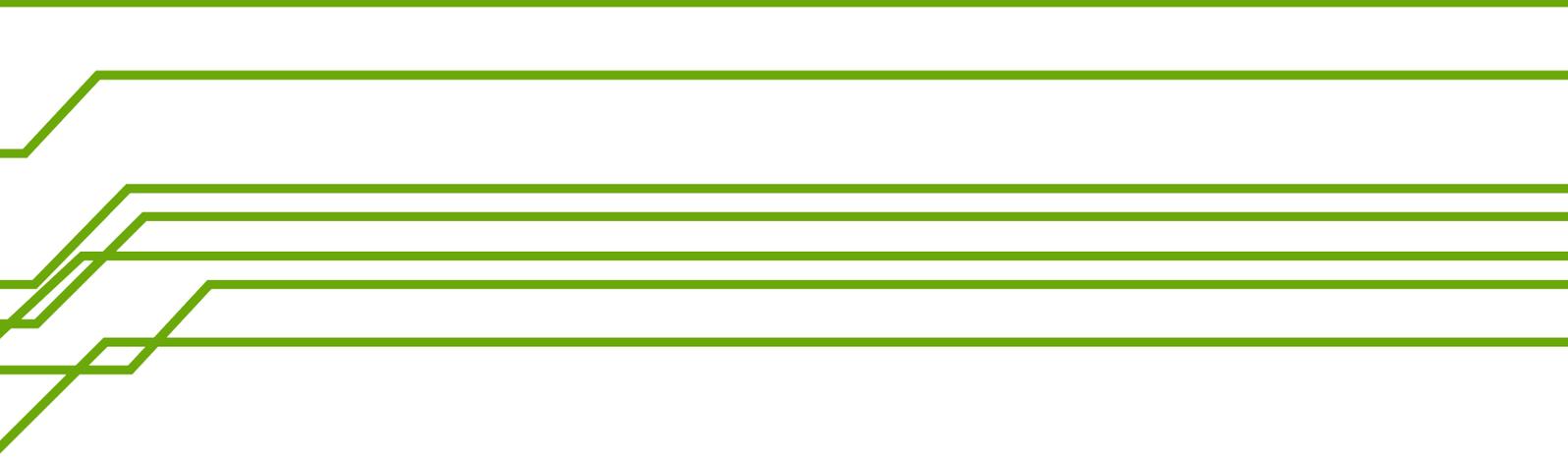
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# CONTEST BRIEF

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Despite cities having strengthened their economy, efficiency, and liveability over the last decades, they are still facing major issues such as contamination, rising inequities, and unemployment, among others. These already harmful conditions for the environment and society are furthermore aggravated by crisis events such as the current pandemic. New planning paradigms that recognize the importance of ecology to respond to these challenges are being developed, by integrating **living systems** in urban environments aimed at improving cities' socio-economic and environmental conditions.

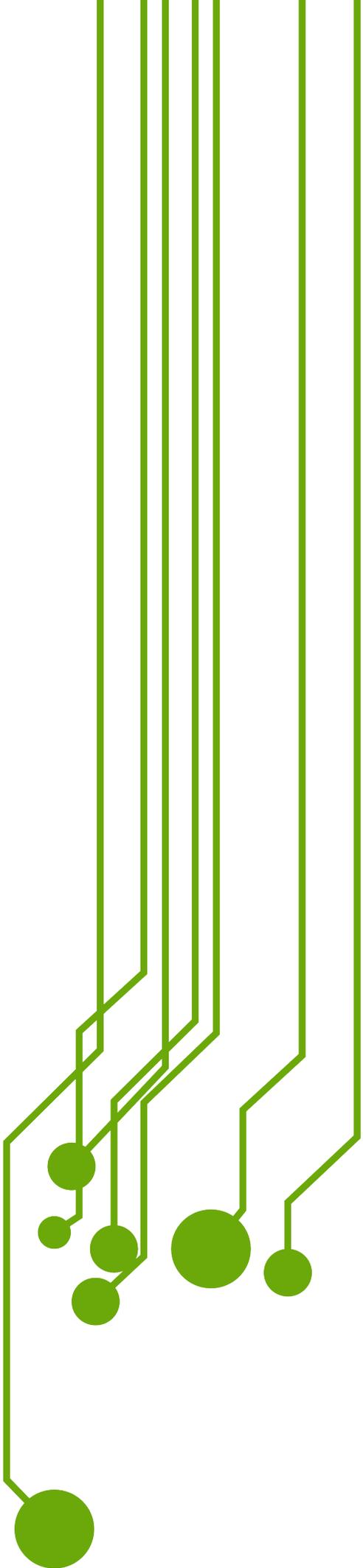
Living systems integrated in cities are also known as **Nature-Based Solutions (NBS)**, defined as ***“living solutions inspired by, continuously supported by, and using nature, which are designed to address various societal challenges in a resource efficient and adaptable manner and to provide simultaneously economic, social, and environmental benefits”*** (European Commission, 2015). NBS can help address several challenges through the provision of multiple ecosystem services such as life support (soil formation and oxygen production); procurement (production of food, drinking water, raw materials or fuel); regulation (climate control and tidal waves, water purification, pollination); and cultural values, including the aesthetic, educational, and recreational values. Intelligent design strategies can help reintegrate nature in cities by transforming urban spaces into liveable, productive, and biodiverse systems.

Advances in digital technologies open new opportunities to facilitate the integration of NBS in the urban environment and to increase the number and the quality of the ecosystem services provided. Digital technologies, for instance, such as simulation tools, open the possibility to test in a virtual environment how the system performs, while digital fabrication allows for the production of non-standardized elements (like green facades, floor tiles, public space furnitures, etc) for a tailored integration of nature in cities. The convergence among biology, ecological sciences and information technology applied to landscape and urban design can create powerful synergies to address the current socio-economic-environmental challenges.

**This Call aims to boost the reflection on how the integration of NBS in cities through technologies can generate innovative visions, methodologies, and solutions.**

- Can the use of technologies support NBS integration in cities with the final goal to enhance the provision of ecosystem services?
- How can we strengthen social relations through the implementation of innovative NBS?
- Will the technology-mediated implementation of NBS in cities lead to the development of innovative business models targeted at addressing current urban challenges?

This Contest is looking for innovative visions for the city of the future where design optimized to integrate nature can **transform urban spaces into systems to live, produce, and restore the environment.**



## THE JURY

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### **ARETI MARKOPOULOU**

#### **Institute for Advanced Architecture of Catalonia - Academic Director**

Arete Markopoulou is a Greek architect, researcher and urban technologist working at the intersection between architecture and digital technologies. She is the Academic Director at IAAC in Barcelona, where she also leads the Advanced Architecture Group, a multidisciplinary research group exploring how design and science can positively impact and transform the present and future of our built spaces, the way we live and interact. Her research and practice focus on redefining the architecture of cities through an ecological and technological spectrum combining design with biotechnologies, new materials, digital fabrication and big data.



### **MATHILDE MARENGO**

#### **Institute for Advanced Architecture of Catalonia - Head of Studies**

Mathilde Marengo is an Australian - French - Italian Architect, with a PhD in Urbanism, whose research focuses on the Contemporary Urban Phenomenon, its integration with technology, and its implications on the future of our planet. Within today's critical environmental, social and economic framework, she investigates the responsibility of designers in answering these challenges through circular and metabolic design. Her investigation is also actuated through her role in several National and EU funded research projects, among these Innochain, Knowledge Alliance for Advanced Urbanism, BUILD Solutions, Active Public Space, Creative Food Cycles, and more.



### **CHIARA FARINEA**

#### **Institute for Advanced Architecture of Catalonia - Head of EU Projects**

Chiara Farinea is an Italian architect and urban planner. She obtained her PhD in Urban Planning at IUAV (Venice), a Master in Advanced Architecture at IAAC (Barcelona), the Architecture University Degree at Politecnico di Milano (Milan), and she studied one year in ETSAB (Barcelona) thanks to the Erasmus Programme. She is a member of the Association of Architects of Genova for more than ten years. Her research focuses on environmental planning and design. Her current position at IAAC includes being a coordinator and scientific personnel in several EU projects targeted at education, research, development and implementation and being faculty in IAAC educational programs.



### **LAURA HOHOFF**

#### **Vienna University of Economics and Business**

Laura Hohoff manages EU projects at the Regional Center of Expertise on Education for Sustainable Development Vienna (RCE Vienna) at the Vienna University of Economics and Business since 2017.

Her thematic focus is on creating educational environments for social and sustainable innovations. Between 2017 and 2019 she was sole program manager of the sustainable startup academy 'Playpark Sachsenplatz' embedded in the Interreg EU Project 'CERlecon'. Since then, she has been part of 3 other EU Projects, one of them being the Erasmus+ Project BUILD.

## **CATHERINE SIRGUEY**

### **Associate Professor, Université de Lorraine**

With a Ph.D. in Agronomical Sciences, Dr Catherine Sirguy is Assistant Professor at Université de Lorraine, France, at Ecole Nationale d'Agronomie et des Industries Alimentaires (Ensaia, a Graduate Engineering School for Agronomy and Food Sciences). At Ensaia, she teaches and lectures on soil sciences, agricultural sciences and environmental sciences. Her work and research has been widely published on different platforms.



## **MARITÉ GUEVARA**

### **Ersilia Foundation**

Master degree in Communications and Publishing by the University of Barcelona, and a Bachelor in Communication and Journalism by the University of Puerto Rico, and New York University. Currently working on the dissemination, evaluation and sustainability of the activities and educational programmes in KA Building Urban Intelligent Living Design Solutions / BUILD Solutions, as well as in other ERASMUS+ projects (KAAU, ATHIKA) and H2020 (REBALANCE). She has been organiser, speaker and facilitator of several shared-science and multi-stakeholder workshops around Europe. Member of local and international networks working in the field of sustainability, such as Barcelona Sostenible.



## **CAMILA ÁLVAREZ**

### **Ersilia Foundation**

Architect from the Pontificia Universidad Javeriana in Bogotá, Colombia. Holds a Master in Urban Planning and Policy Design from the Politecnico di Milano in Italy and a Postgraduate Programme in Designing the Region by the Polytechnic University of Catalonia (Barcelona Tech). She has supported capacity-building processes for different actors from the public, private and academic sectors on urban regeneration issues, and has worked in various international competitions and workshops. She has participated in coordinating as a researcher in urban planning and development projects in Colombia, Brazil, Italy, France, and Spain.



## **LASSE ANKERSTRÖM**

### **Senior Anthropologist at Green Innovation Group A/S**

With the background of Cand.Scient.Anth from UCPH and 10 years' experience in facilitation, Lasse works to accelerate the green transition through human-centered innovation. By combining a keen eye for the socio-cultural context of both public and private organizations with systematic and empathetic pragmatism, Lasse guides groups to their designated sustainability goals. This approach has informed both workshop facilitation and analytical reports through the years at Green Innovation Group.



## **GABRIELLE MICHAUDEL**

### **Agronomic engineer at Econick**

After five years studying agroecology, soils, waters, and territories, Gabrielle graduated as an agronomic engineer from UniLasalle University, in France. Since then, she has been working at Econick, a startup that uses hyperaccumulator plants for metal crop production in order to produce environmentally friendly metals from those plants. Her work includes studying metal hyperaccumulating plants with the aim of selecting those with the best capacities, and to produce and implant them on polluted soils such as industrial wasteland, or soils with natural high metal concentrations.





# WINNING PROJECTS

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# PLANT&EDUCATE IN PORTO ALEGRE

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## **Yasmin Feijó Jaskulski**

Advisors: Eugenia Aumond Kuhn and Geisa Zanini Rorato  
Federal University of Rio Grande do Sul

Brazil

## **1st Place - Overall Winner Decided By BUILDS Partners**

KEYWORDS: Urban Agriculture, Resilience, Industrial Heritage, Social Reintegration, Vertical Farm

### ABSTRACT:

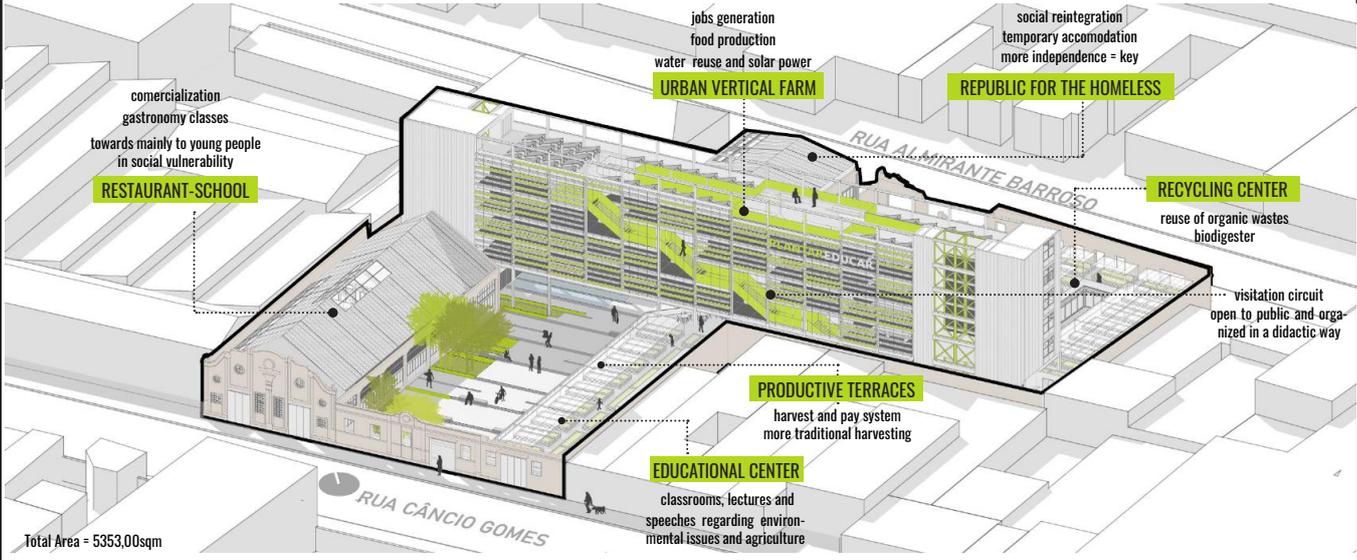
Plant&Educate in Porto Alegre is a project that develops an urban vertical farm combined with a restaurant-school and a republic for the reintegration of former homeless people in the 4th district of Porto Alegre. Urban agriculture (UA) is already known as a strategy for food security, bringing consumers closer to production, reducing costs with transportation and creating an environmental conscience. The urban vertical farm allies technology with more efficient and sustainable production. Moreover, this project also proposes to create a space of discussion regarding the environmental issues, climate change and the preservation of natural ecosystems. It is situated in the 4th District of Porto Alegre, the old industrial area of this Brazilian city that entered a degradation state after the departure of many factories in the 70's. Today the area has abandoned buildings and a wide socially vulnerable population. Therefore, it was chosen to intervene in a very characteristic lot, the old Wallig Stoves Factory deactivated in the 80's. Today we see the ruins of the sheds and the historical facades of 1921, which are considered historical heritage. This project aims to ally nature, quality food production, food security, technology and social support, generating jobs, offering training classes at low costs and temporary shelter for people without homes. In addition, it aims to have a close relationship with schools and the general public, creating an example of resilient food production. Finally, it was thought to be a democratic space with quality open areas that benefit the microclimate and the population.

# PLANT&EDUCATE IN PORTO ALEGRE

a new productive system for  
the old industrial district



**WHAT.** This project will develop the program of an **urban vertical farm** combined with a **restaurant-school** and a **republic** for the reintegration of former homeless people in the 4th district of Porto Alegre. Urban agriculture (UA) is already known as a strategy for food security, bringing consumers closer to production, reducing costs with transportation and creating an environmental conscience. The vertical farm is a modality of UA that uses technology to make production more efficient and sustainable. Moreover, this project also proposes to create a **space of discussion** regarding the environmental issues, climate change and the preservation of natural ecosystems. **WHERE.** This project is situated in the **4th District of Porto Alegre**, the old industrial area that entered a degradation state after the departure of many factories in the 70's. Today it's noticed as place of abandoned buildings and a wide social vulnerable population. Therefore, it was chosen to intervene in a very characteristic lot, **the old Wallig Stoves Factory**, it was deactivated in the 80's and today it is perceived by the ruins of the sheds and the historical facades, that were project of the eclectic architect Theo Wiederspahn, in 1921. The buildings and facades are considered historical heritage within the city hall. **WHAT FOR.** The project aims to ally **nature, quality food production, food security, technology and social support.** A percentage of production will be available for social vulnerable communities nearby, generating jobs, offering training classes at low costs and temporary shelter for people without homes. Beyond that, it aims to have a close relationship **with schools** and the general public, creating an **example of a resilient food production.** Finally, it is thought to be a democratic space with quality open areas that bring people together and **benefit the microclimate.**



01. EXISTENT OLD FACTORY STRUCTURES IN RUINS
02. DEMOLISH/BUILD MOST DETERIORATED STRUCTURES AND BUILD A DELIMITATION TO THE INTERVENTION
03. STRUCTURING FACADES AND PRESERVING THE ORIGINAL SPATIALITY
04. BASE CONCENTRATED IN THE BORDERS/ CONNECTION OF STREETS/ DIFFERENT OPEN SPACES
05. BASE PRESERVATION OF THE FACADE'S SCALE



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06. MAIN VOLUME BACKGROUND TO THE OLD BUILDINGS

07. MAIN VOLUME MODULATED BUILDING WITH STEEL STRUCTURE

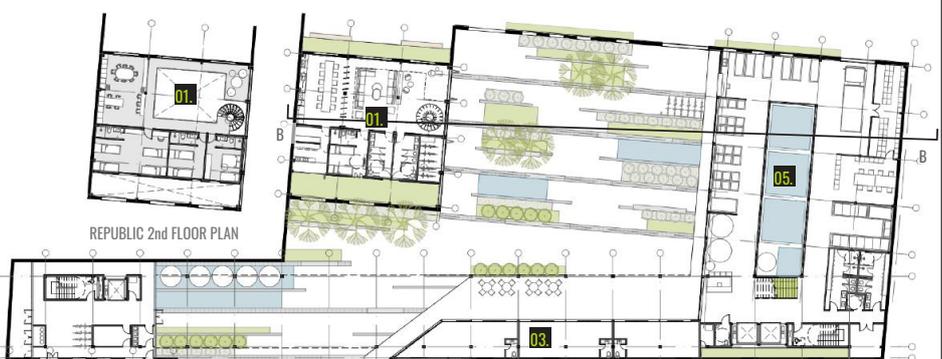
08. ORGANIZATION MORE "TRADITIONAL" FUNCTIONS IN THE PRE-EXISTING BUILDINGS

09. ORGANIZATION AQUAPONIC FARM IN THE MORE VERTICAL VOLUME

10. VISITATION CIRCUIT THROUGH THE COMPLEX INFRA-STRUCTURE



SITE PLAN | 1:750



REPUBLIC 2nd FLOOR PLAN



GROUND FLOOR PLAN | 1:500



RESTAURANT-SCHOOL 2nd FLOOR PLAN PAVTO



REPUBLIC 3rd FLOOR PLAN



PRODUCTIVE BUILDING 3rd FLOOR PLAN

- 01. REPUBLIC FOR THE HOMELESS**  
Ground floor - reception, living area, shared kitchen, storage, bike locker, accessible bedroom and bathrooms; 2nd floor - family, double and collective bedroom, studies area; 3rd floor - family, double and collective bedroom, studies area, collective garden, kitchen with barbecue uni.
- 02. RESTAURANT-SCHOOL**  
Ground floor - commercializing area, main kitchen, locker rooms, gas central, residual storage; 2nd floor - research area, commercializing area, classrooms.
- 03. STORES**  
Stores focused on sustainable and organic products.
- 04. EDUCATIONAL CENTER**  
Multipurpose spaces, classrooms, restrooms.
- 05. FARM BASE**  
Composting center, biogas room, fish tanks, storage, charge-discharge.
- 06. PRODUCTIVE BUILDING (AQUAPONIC FARM)**  
Laboratories, production, sanitation areas, support areas, germination.



INTERIOR VIEW OF RESTAURANT-SCHOOL (GROUND FLOOR)



INTERIOR VIEW OF A RESTAURANT-SCHOOL'S CLASSROOM (2nd FLOOR)



INTERIOR VIEW OF THE REPUBLIC FOR THE HOMELESS' COMMON AREA (GROUND FLOOR)



VIEW OF THE ARRIVAL FROM CANCIO GOMES STREET



VIEW OF THE ARRIVAL FROM ALMIRANTE BARROSO STREET

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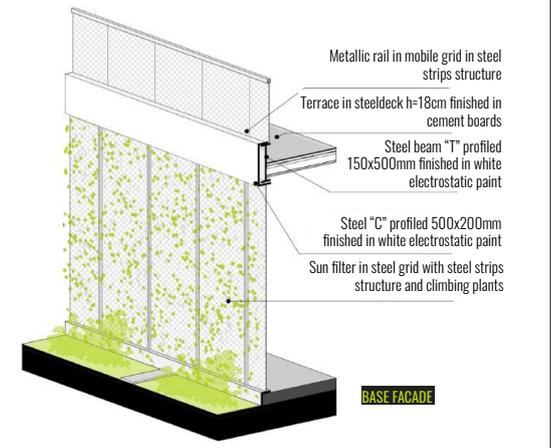
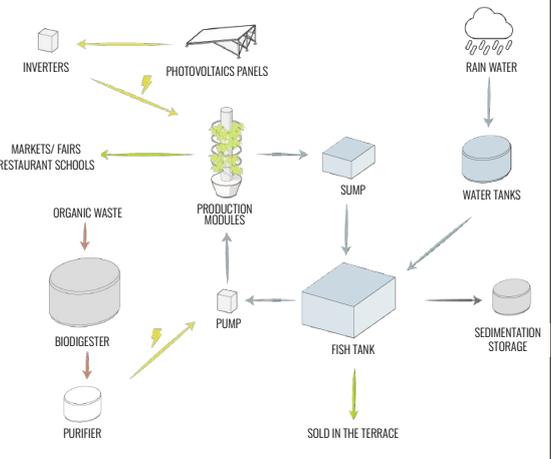
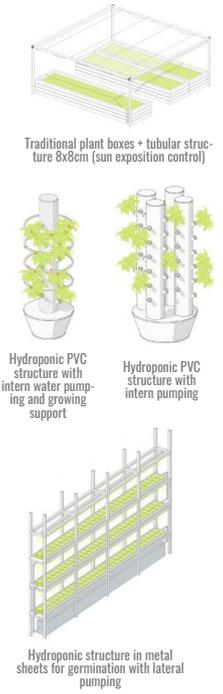
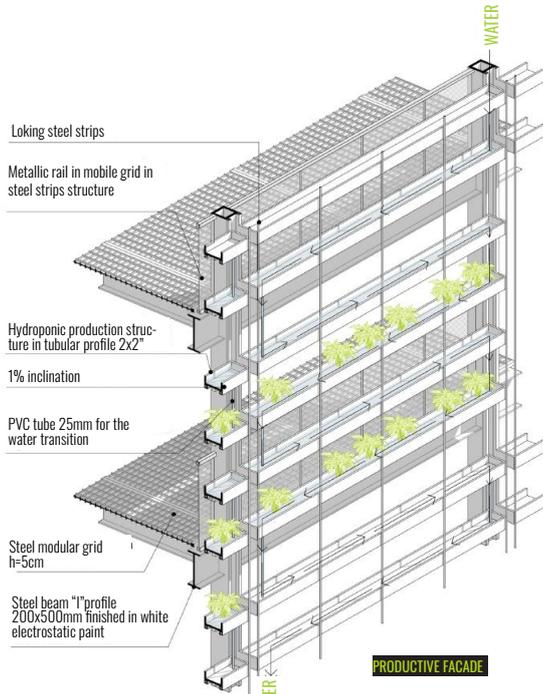
11. INTERVENTION BLOCKS IN THE EXTREMES OF THE PRE-EXISTENCES FOR THE MORE COMPARTMENTED FUNCTIONS (KITCHENS, RESTROOMS, BEDROOMS)

12. INTERVENTION ALONGSIDE WERE SITUATED THE LESS COMPARTMENTED AREAS (LIVING AND STUDIES AREAS)

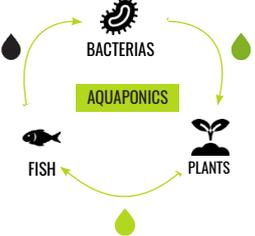
13. INTERVENTION BLOCK IN THE MIDDLE SERVES AS A CLASSROOM-SHOWCASE ALONGSIDE THE RESTAURANT, BRINGING PEOPLE CLOSER FROM THE EDUCATIONAL USE

14. FARM IN THE EXTREME OF THE VOLUME ARE THE SUPPORT AREAS (RESTROOMS, LABS, WATER TANKS, EMPLOYEES AREAS) AND IN THE CENTER IS FOOD PRODUCTION

15. PRODUCTIVE FACADE: TAKING ADVANTAGE THE MAXIMUM OF THE NATURAL LIGHTING FOR PRODUCTION, IT WAS CREATED A PRODUCTIVE FACADE



So the complex of the farm become **self sufficient** and an **example of sustainable food production**, the project has different reuse systems. In the ground floor there is a **composting center** which will recycle the organic waste of the complex and will become a fertilizer to the farm or will go to the **biodigesters** to provide energy for the farm lights. Also, the organic waste of the neighborhood can be use as compost, giving new purpose to the population residuals. Moreover, **photovoltaic panels** in the roof of the building will use the solar energy to pump the aquaponic systems. Due to the aquaponic system there is a **closed cycle of water reuse**, from rain water to biofilters, to vegetables and fish. Another strategy used is the **productive facade** which aims to utilize the most out of natural light and it uses a system of water cascade that keeps water running through the structures at all times.



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# REMODELING AND SYMBIOSIS

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**Jiawei Liang & Siyuan Tan**

Teammate

China

**1st Place - Winner Decided By IAAC**

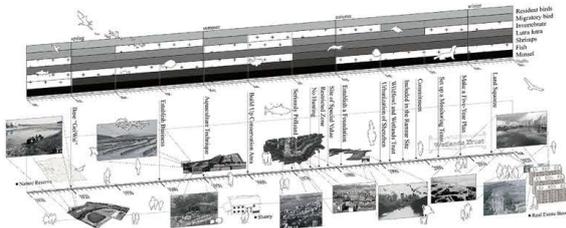
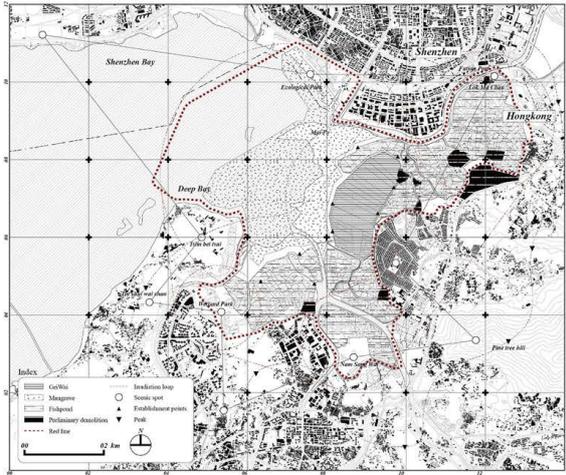
KEYWORDS: Dark Ecology, Local Construction, Inhabitable Landscape, Remodeling, Symbiosis

ABSTRACT:

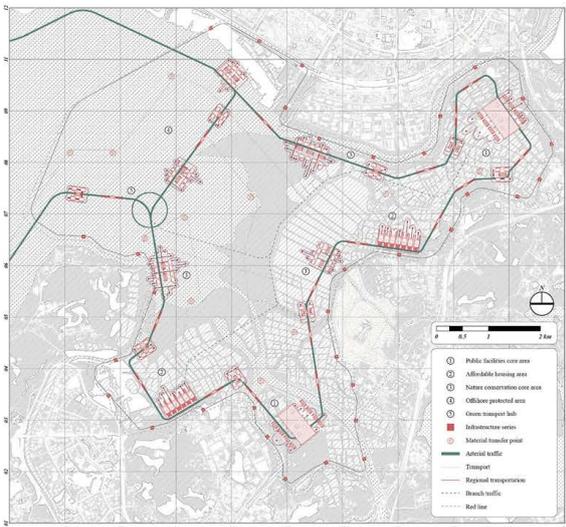
Timothy Morton, a philosopher at Rice University, argues that we must confront nature not just with its beauty, but also with its darkness and weirdness – an idea he calls “Dark Ecology.” The point of ecology is to “disenchantment” human load on nature’s infinite significance, To restore nature itself and admit that “natural filth” is the real existence of the natural world. In fact, we are intimately connected to everything else. “Humans” as a complex combination of human and non-human, the world is not fixed on the human scale. In Timothy Morton’s philosophical view, we can observe that under the capitalist ideology, simple environmentalism forms a binary opposition relationship between nature and human beings, and separates human beings from nature. Now we need a new form to reflect or construct a new vision. Using Dark Ecology theory and local construction to create an Inhabitable Landscape for an Alternative Economy in Mai Po, Hong Kong. While improving the environment of the border between Hong Kong and Shenzhen, allowing residents and animals to live in harmony and sustainable development, we are not trying to return it to the tranquility of nostalgia, but by implying the “hyper-natural” to replace the original separated environment, where we honestly admit our SINS and coexist with toxicity. Remodeling and symbiosis reflect an ideal vision, but it is also about destroying nature/human dichotomy, changing and confronting the current narrow consumer culture and environmentalist view of nature, and representing a better form of ecological criticism in the post-pandemic era.

# Remodeling and symbiosis

Midnight in the Garden of Good and Evil

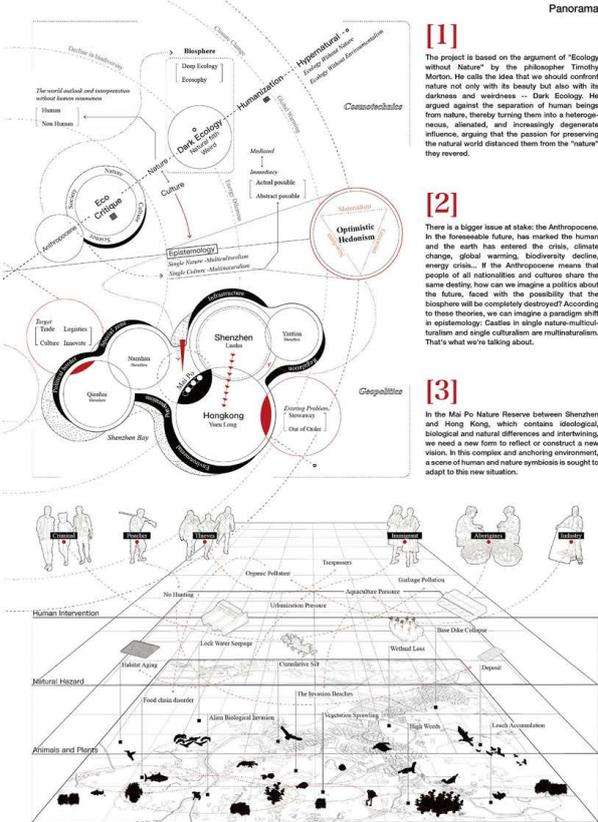


**Mapping**  
 Mai Po Marshes is a nature reserve located in San Tin near Yuen Long in Hong Kong. It is within Yuen Long District. It is part of Deep Bay, an internationally significant wetland that is actually a shallow estuary, at the mouth of Sham Chun River (Shan Tai River (Yuen Long Creek) and Tin Shui Wai Nubak). Inner Deep Bay is listed as a Ramsar site under Ramsar Convention in 1995, and supports globally important numbers of wetland birds, which chiefly arrive in winter and during spring and autumn migrations. It provides a conservation area for mammals, reptiles, insects, and over 350 species of birds.  
 Deep Bay faces threats, including pollution, and rising mudflat levels that perhaps arise from intense urbanization, especially in recent years on the north, Shenzhen side of the bay.



**Master Plan**  
 Different devices are placed in the site according to different site characteristics. Through the coordination of traffic, the whole park operates normally, and six different devices play their own functions. Generate a livable landscape with an alternative economy. To improve the environment at the border between Hong Kong and Shenzhen, and to allow residents and animals to live harmoniously and sustainably, we are not trying to return it to the tranquility of nostalgia, but to replace the original divided environment by suggesting "hyper-natural" ways, where we honestly admit our SRS and coexist with toxicity.

Panorama



**[1]**  
 The project is based on the argument of "Ecology without Nature" by the philosopher Timothy Morton. He calls the idea that we should confront nature not only with its beauty but also with its darkness and weirdness -- Dark Ecology. He argued against the separation of human beings from nature, thereby turning them into a heterogeneous, alienated, and increasingly degenerate influence, arguing that the passion for preserving the natural world distanced them from the "nature" they revered.

**[2]**  
 There is a bigger issue at stake: the Anthropocene. In the foreseeable future, has marked the human and the earth has entered the crisis, climate change, global warming, biodiversity decline, energy crisis... If the Anthropocene means that people of all nationalities and cultures share the same destiny, how can we imagine a politics about the future, faced with the possibility that the biosphere will be completely destroyed? According to these theories, we can imagine a paradigm shift in epistemology: Castles in single nature-multiculturalism and single culturalism are multiculturalism. That's what we're talking about.

**[3]**  
 In the Mai Po Nature Reserve between Shenzhen and Hong Kong, which contains ideological, biological and natural differences and intertwining, we need a new form to reflect or construct a new vision. In this complex and anchoring environment, a score of human and nature symbiosis is sought to adapt to this new situation.

Paradigm

Inspired by Hieronymus Bosch's painting "Ship of Fools" (Narrenschiff) which depicts a battle for food aboard a small boat among the freaks: misers, standstills, drunks, adulterers, bohemians, bible misinterpreters and so on.  
 The same is true in nature, which is not always a symbol of the divine, but also a carrier of sin. Through the type translation and function replacement of the objects in the painting, six devices with different functions were created and integrated into the "ship" of Mai Po.

	<b>Laboratory</b> In the laboratory there are educational, exhibition, experimental and natural history functions. In different zones, there are different functions. Identify the large protective equipment, there is Multiple Fish Nursery, which nurtures fish and aquatic plants to protect biodiversity.	
	<b>Collection House</b> It provides adaptive housing for poor residents in the surrounding area, and also takes care of the disposal of garbage, which is responsible for recycling the non-recyclable garbage in the area.	
	<b>Garden</b> The garden is a Bayou Wetland device designed to provide a more comfortable living environment for migratory birds and other organisms. It can cope with extreme weather calmly with the wetland equipment.	
	<b>Governance</b> Governance is the vertical device that provides research base inside area in self-possible, the institutions are all rooted can control before control institution. It is a device that cleans up the road.	
	<b>Viewing tower</b> It is designed to carry tourists for lighting and activity performance, and it is located in places where tourists can enjoy the scenery. Meanwhile, it can store Energy Storage for the M&E providing traffic and scenery for the operation of the park.	
	<b>Security</b> The security facilities distributed around the park are responsible for the daily management of the park and the human between the institutions can block the impact of the surrounding urbanization. An environmental vigilance with Peninsular National Reserve.	

LW818

# Remodeling and symbiosis

Midnight in the Garden of Good and Evil

## Detail

**Energy Harvesting Mill**  
Wind energy  
Hydroenergy  
Biomenergy

**Pneumatic Nutrient Removal**  
Internal inflow  
Aeration  
Nitrification  
Denitrification  
Return sludge flow

**Sludge Removal**  
Methane  
Sludge water  
Rinse  
Rinse sludge  
Spill disposal

**Buoyant Wetland**  
Equipment  
Aerobiotic  
Transformation  
Resorb

**Multitrophic Fish Nursery**  
Sand filter  
Carbon filter  
Chlorine dioxide  
PAC Blender

**Garbage Collection**

## Storyboard

In the post-pandemic era, everyone's memory of 2019 seems to be gone.

People fantasize every day about going back to their old lives.

At the same time, the natural world was dramatically overturned, with animals becoming active and humans isolated. When humans are cut off from nature, they are also cut off from animals.

Humans began to plot new lives in public spaces, opportunities to coexist with the epidemic.

Remodeling Symbiosis

To welcome the visitors

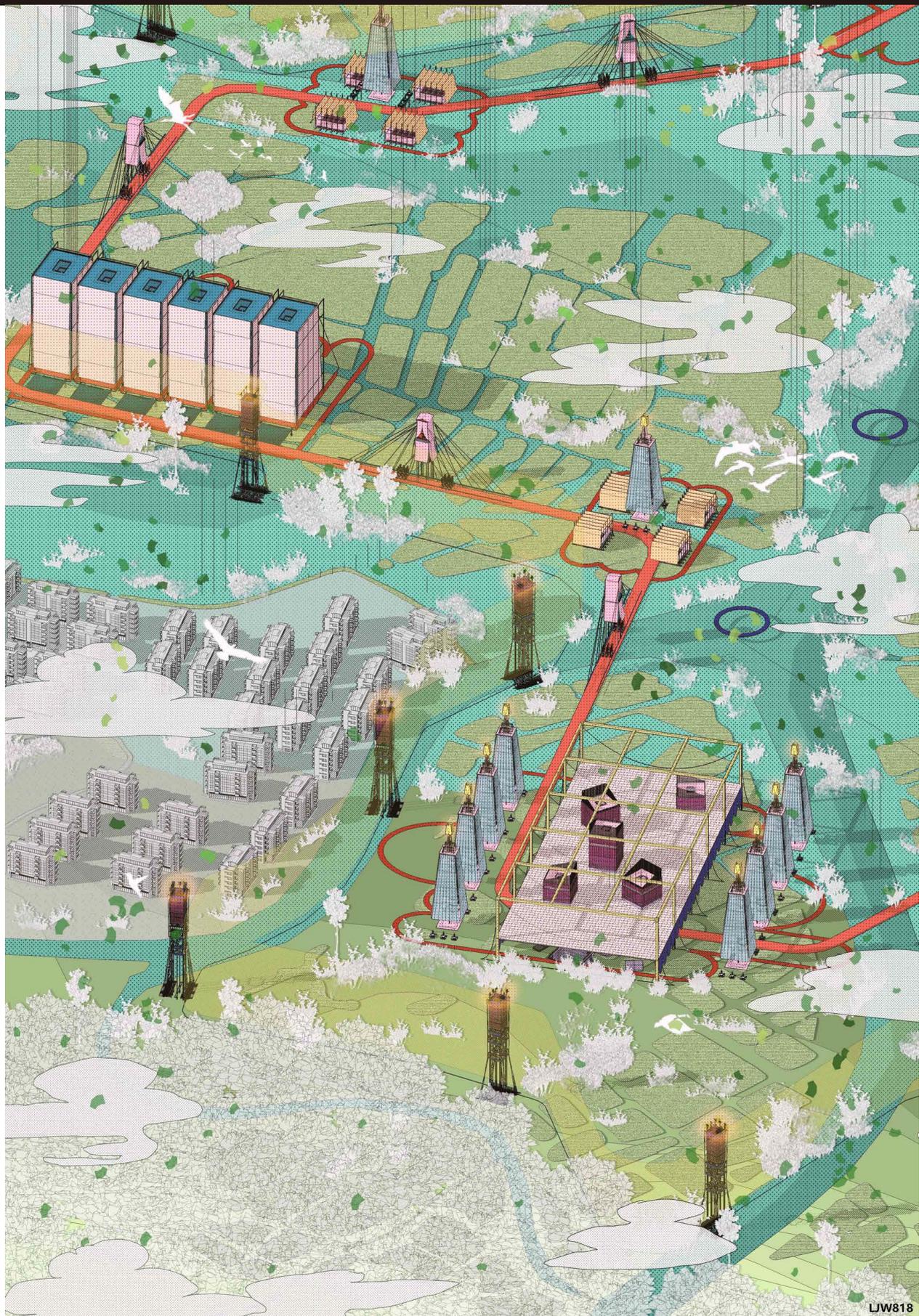
Between human beings and animals, we should find a co-existence space and live together.

Support refugees

As night falls, all traces of darkness begin to multiply, which is also a part of nature, for better or worse.

This is nature, a real nature. The good and the bad coexist, ecosystems can work all the time, and at Mai Po we experience a kind of reshaping and symbiosis of hyper-nature.

LJW818



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# LIVING ARCHITECTURE: FORMULATING URBAN FARM SYSTEMS THROUGH NATURE BASED SOLUTIONS

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**Orlagh Casey**

Queen's University, Belfast  
Belfast, Northern Ireland

**Honourable Mention**

KEYWORDS: Urban Farm, Algae, mycelium Architecture, Circular Design, Bioplastics

ABSTRACT:

'Living Architecture: Formulating Urban Farm Systems Through Nature Based Solutions' explores the potential for urban based farming systems designed and constructed by new technologies in conjunction with natural matter (Mycelium) and waste to tackle high levels of pollution in our environment. The proposed scheme sets out to eliminate waste through the implementation of a circular system that creates viable products (orange peel bioplastics planting pods) through the collection of waste to real time repurposing into new products through 3D printing pavilion towers. The scheme explores a new form of architecture- not one that is static and unresponsive, but one that is alive and growing, one that utilises natural resources, recognises and tackles pollutants. The scheme will create a rich urban ecosystem, communicating flows of information from one tower to another, it will become a living membrane that will feed on our waste and in turn produce a living food system. The 3d printers constructed within the mycelium towers create proactive behaviours within the system by turning waste products and food waste into continued needs for the consumers, thus the consumer is supplying their own demand creating a sustainable urban system.

This proposal explores the implementation of future systems within the existing built environment in order to tackle widespread pollution. It allows us to face the realities of our waste and the effects it has on our environment by accepting that we demand, we use and we waste but we can also learn, we can create, we can heal.

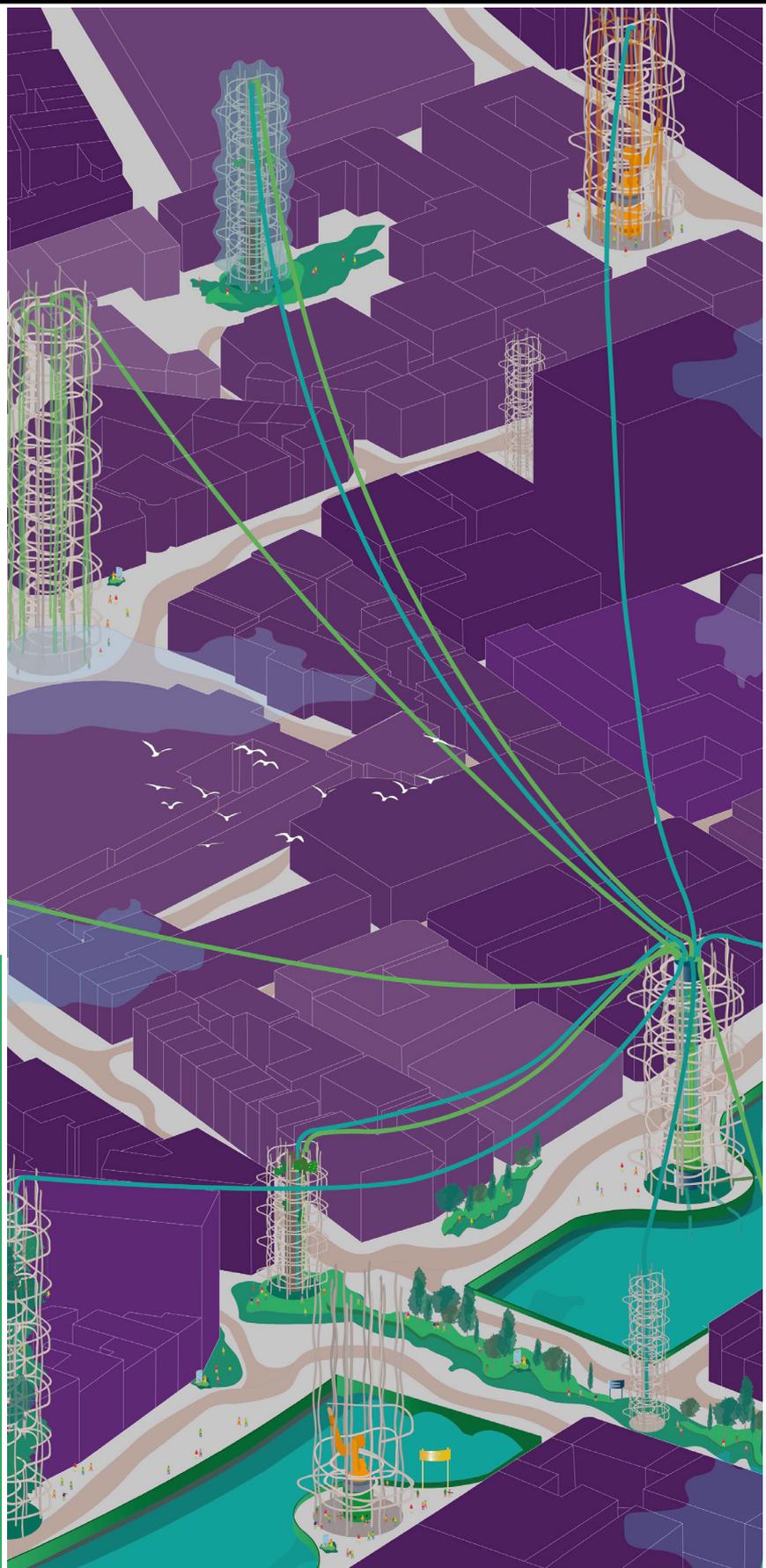
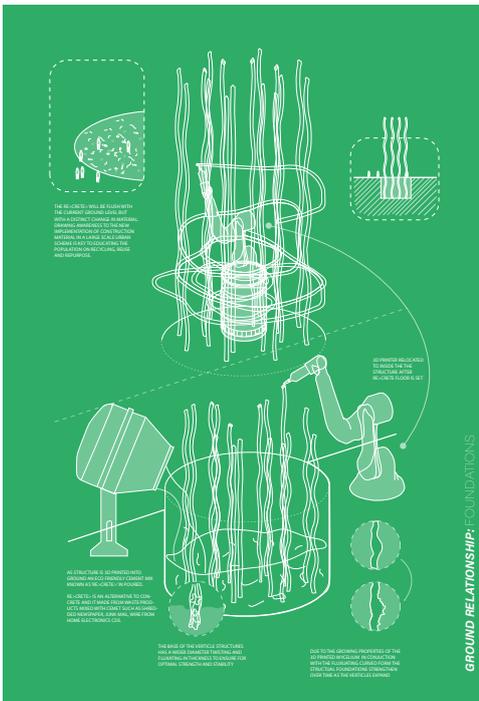
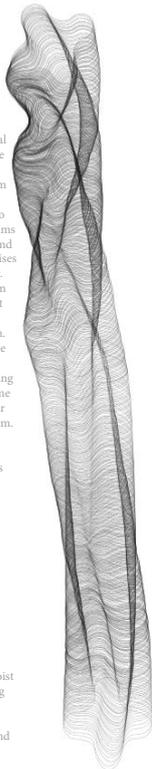
# LIVING ARCHITECTURE: FORMULATING URBAN FARM SYSTEMS THROUGH NATURE BASED SOLUTIONS

Living Architecture: Formulating Urban Farm Systems Through Nature Based Solutions explores potential for urban based farming systems designed and constructed by new technologies in conjunction with natural matter and waste to tackle high levels of pollution in our environment. The proposed scheme sets out to eliminate waste through the implementation of a circular systems that creates viable products/ food products. This proposal explores the use of new construction technologies through the use of robotics i.e. 3D printing. Through this method new materials can be created, formed, and controlled with the use of computational design and BIM softwares. This scheme forces us to recognise our contribution to climate change by taking back our waste. Exploring the active environmentally positive properties from organically sourced building materials in collaboration with computational design and emerging technologies allows us to approach urban design in the right way. This proposal also aims to explore a new form of architecture. Not one that is static and unresponsive, but one that is alive and growing, one that utilises natural resources, recognises and tackles pollutants in the air. With a mixture of natural matter and technology not only can a new form be designed but a new urban system. This project offers a large scale urban solution to an even larger global problem with the key to the scheme being human interaction. This proposal delves into eradicating waste in the area that we produce it the most- our cities. The scheme will create a rich urban ecosystem, communicating flows of information from one tower to another. It will become a living membrane that will feed on the waste of the land (our waste) and in turn producing a living food and product system. The living architecture of this scheme is its ability to react to its surrounding, the smart material uses allow the structure to clean the surrounding pollutants in the air. The 3d printers constructed within the towers create proactive behaviours within the system by turning waste products and food waste into continued needs for the consumers. Thus the consumer is supplying their own demand creating a sustainable urban system.

The large purple illustration (right of page) showcases the 'farming towers' in an urban setting (Dublin city centre), it represents the beginning of a new city life, one of health, healing, and education.

The black line drawing explores the twisting 3d printing mycelium structure of one vertical. The science behind this design is to encourage mycelium growth by creating dark moist areas within the structure, thus holding stronger air purifying properties.

The green drawing below begins to explore the Tower's ground relationship, how the mycelium will thrive and grow within the foundations to create a stronger structure with the use of R&Crete materials.



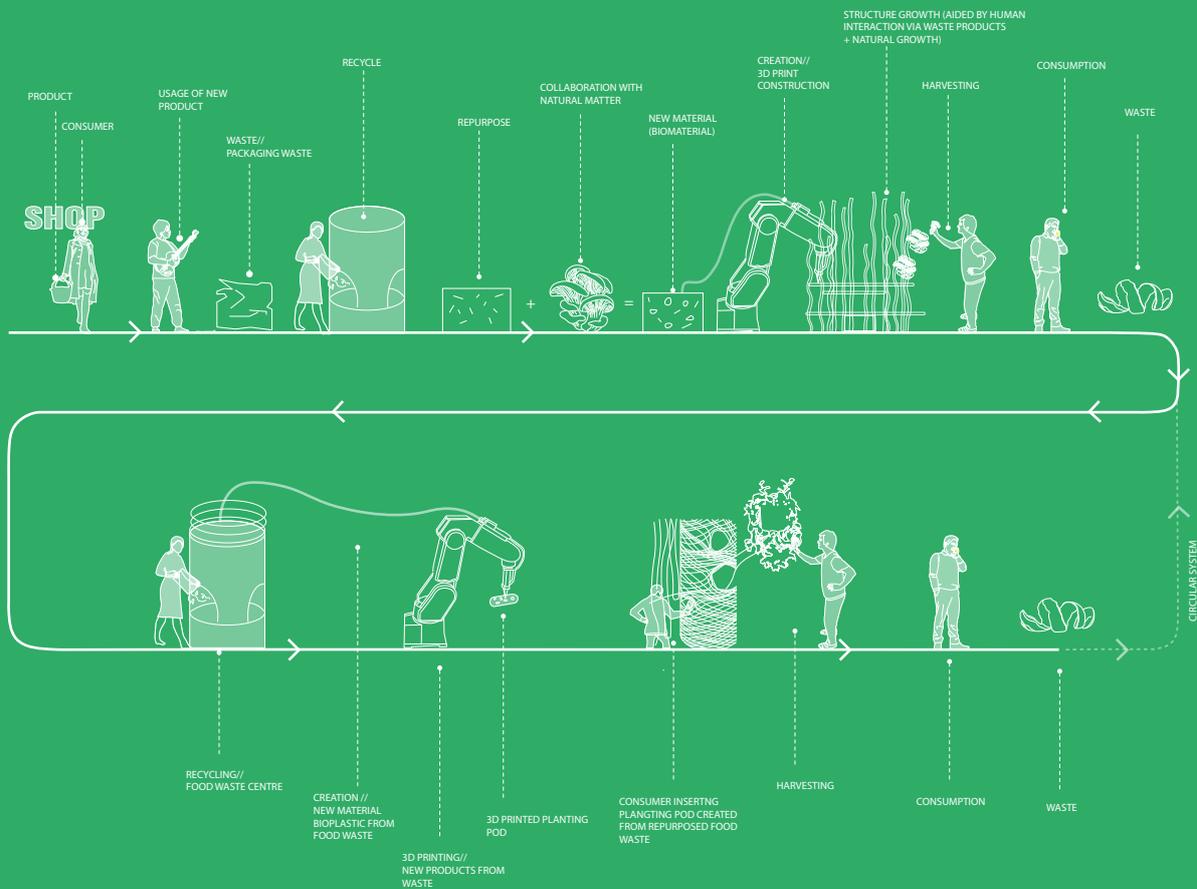
# URBAN/ HUMAN INTERACTION

With the vast number of imports, the demanding consumer disregards the importance of supply and demand, and the realities of not appreciating how far a single piece of fresh fruit has travelled for them to buy, not use, and then throw away. The average household wastes 117kgs of food a year. When not disposed of properly the food waste goes to landfill and produces methane gas, a greenhouse gas that is 25 times more potent than CO2 and a lot more harmful to human health. The food companies that supply these fresh produce follow strict guidelines so that the fruit and vegetables we purchase look good on the shelves, because we wouldn't purchase anything that doesn't look perfect as there may be something wrong with it, when in fact it's perfectly fine to consume. Our relationship with fresh produce can be uneducated. We must create a system where we understand the time, effort and resources that go into the growth of these produce and the cycle of what happens when left over food and food waste get disposed of. What would a system look like that eradicates food waste and tackles the CO2 pollutants?

The render on the top half of this page illustrates the farming towers in an urban setting, showcasing fresh food farming towers to algae extraction towers which are used to fertilise crops in surrounding towers and contribute to the creation of healthy new food products.

The diagram below illustrates the process of integrating current consumer habits into the farming tower proposal showing of vital human interaction in each stage of the scheme.

The implementation of a living system within an urban setting offers a new lifestyle concentrated around health for humans and our environment, it looks to natural resources that cause damage to our atmosphere and uses new technologies to repurpose them into useful matter. Out of sight out of mind behaviours can be no longer, this scheme allows us to face the realities of our waste and the effects it has on our environment by accepting that we demand, we use and we waste but we can also learn, we can create, we can heal. The use of modern robotic technological systems allows us to create intelligent systems through nature based solutions. Here we can create new living materials that react and proactively change our air qualities. We can design new product materiality through food waste and new construction materials through product waste.



**RESPONSIVE**  
**CITIES** DESIGN WITH NATURE  
**SYMPOSIUM**

COA9S5

## STRUCTURE & MATERIALITY

The sourcing of building materials has arrived at a new milestone- sourcing from nature with the help of technology and design. we can no longer look to our traditional manmade production line of brick, concrete, and timber. we must explore the possibilities of 3D printing with reprocessed 'shell nutrients' and food waste to create strong structures that will last forever and if deconstructed can dissolve back into nature, both land and water. we can't afford to make any more non-biodegradable, chemical emitting materials that we bury within our planet once we are done with them. This proposal looks at creating living architectural structures that react to their surroundings, contributing positively to the environment.

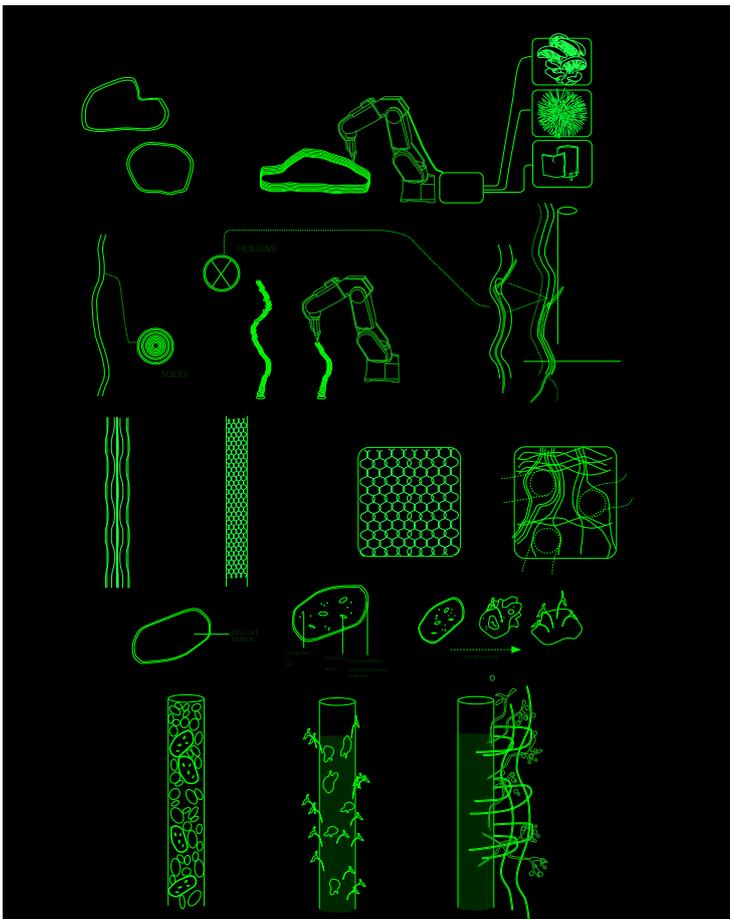
To further explore the design of my project I used 3d printing software to construct a physical model of my design. I began this process through visual coding design on Grasshopper where I was able to adjust height, thickness and radius of structure. I then brought the model into Sketch up to scale and explode components suitable for printing. This printing process took 8 hours and 42 minutes. I was then able to construct the components to make the Farming Tower. Here I was able to mimic the planting core were I planted and watered cress seeds.

the primary use of the trunk like structure is to grow fresh produce. taking inspiration from the anatomy of trees through displacing the rings in shape and scale begins to shape a flexible scaffold structure allowing for maximum growth. The sensory system of plants allows them to search for surrounding forms to grow around. This design offers a range of alternative growth paths to encourage growth of plants. The illustration below explores the construction and growth of the mycelium towers.

Another element within this proposal looked at the smaller scale areas- but equally important. The creation of new nature based materials. The photographs to the right of this page showcase several first-hand experiments creating orange peel bioplastics. These material experiments were carried out to explore how easy it is to incorporate our food waste into new materials and repurpose them for use again. With the farming tower scheme this material would be 3d printed as a skin for 'planting pods' which when placed in the core of the towers would eventually open up releasing the seeds to allow for controlled growth whilst aiding plant health with no waste.

To build with materials that have active environmental positive properties is a growing sector within the design and the built environment. Designers, researchers and architects explore the possibilities of new material construction through 3d printing organic matter and applying these to structural designs.

This proposal explores the implementation of future systems within the existing built environment in order to tackle widespread pollution. I propose a nature-based solution crossed with new robotic technologies to create a zero waste co2 free lifestyle.



# SVA: A VISION OF SELF-SUSTENANCE

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**Dharan Koruduvar**

India

**Honourable Mention**

KEYWORDS: Sva, Self-Sustainable, Nature-based solutions, City for all, SDGs

ABSTRACT:

Cities contribute more than 70% of the world's CO2 emissions. Cities have a long flow network which contributes the most to the Co2 emissions. Systems like Wastewater treatments, Solid waste to landfills, food supply, energy production and many more depend on a long supply chain and non-sustainable industrial methods, and these are the major leaders in the environmental degradation in and around the cities. While I understand the need for these city-level systems, I think there is a need to look at more stable, short and local networks that can reduce the overall carbon footprint.

So, my bold vision is to integrate nature-based living systems into the everyday life of the people and design an ideal sector that is self-sustainable. My design premises include:

- 1)Food
- 2)Water
- 3)Energy
- 4)Waste
- 5)Biodiversity

In Ideal Sector each household has their own productive landscape which includes a compost pit, farms and solar panels whereas on the sector scale it has food towers that could cater to the overall need for food in the sector. This sector also has its own systems which are interconnected and interdependent on the citizens of the sector where imagine, instead of waste going to landfill, it becomes the input for farms. Instead of Greywater from households going to STPs begin to feed into bioswales around the street and recharge groundwater. Imagine black water getting treated in the sector through wetlands - providing nutrients for fish farming or compost for growing food. A relationship loop that contributes to resilience and environmental sustainability.

# Sva: A vision of self-sustenance

*'Growing your own' by nature based solutions- norms for food, energy, Waste and biodiversity*

Cities contribute more than 70% of the world's CO2 emissions. Cities have long flow network which contributes the most to the CO2 emissions. Systems like Wastewater treatments, Solid waste to landfills, food supply, energy production and many more depend on a long supply chain and non-sustainable industrial methods, and these are the major leaders in the environmental degradation in and around the cities. While I understand the need for these city-level systems, I think there is a need to look at more stable, short and local networks that can reduce the overall carbon footprint.

So, my bold vision is to integrate living systems in the urban environment and combine it in the everyday life of the people. To design an ideal sector that is totally self-sufficient, only include nature base solutions and defies the existing long supply chain systems in the cities. My design premises include:

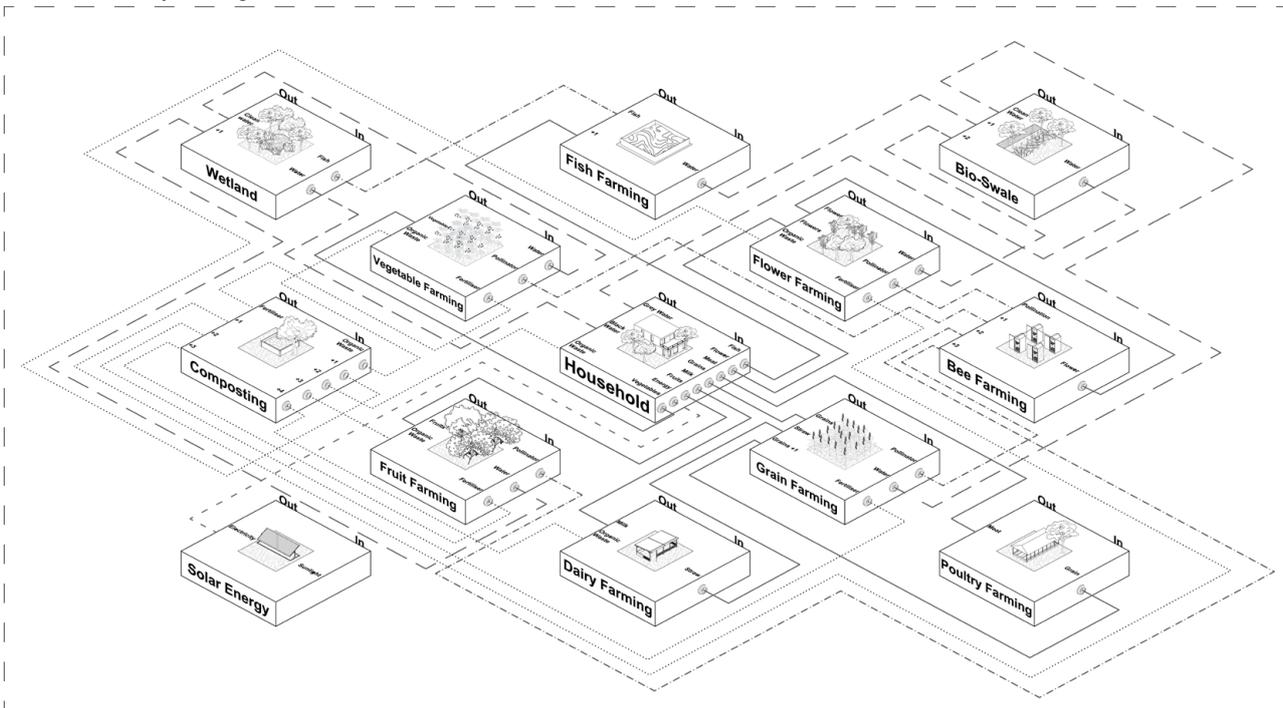
**1)Food 2)Water 3)Energy 4)Waste 5)Biodiversity**

In Ideal Sector each household has there owned productive landscape which includes compost pit, farms and solar panels whereas on the sector scale it has food towers that could cater to the overall need for food in the sector. This sector also have its own systems which are interconnected and interdependent on the citizens of the sector where imagine, instead of waste going to landfill it becomes the input for farms. Instead of Greywater from households going to STPs begin to feed into bioswales around the street and recharge groundwater. Imagine black water getting treated in the sector through wetlands - providing nutrients for fish farming or compost for growing food. A relationship loop that contributes to resilience and environmental sustainability.

// Catered SGDs //



// Self-sustenance system diagram //



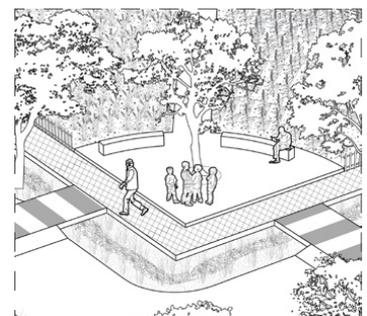
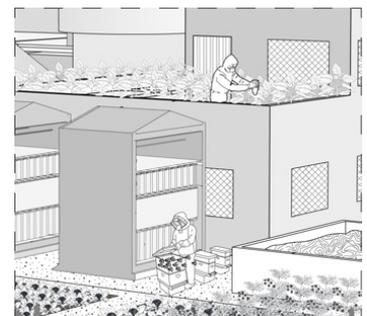
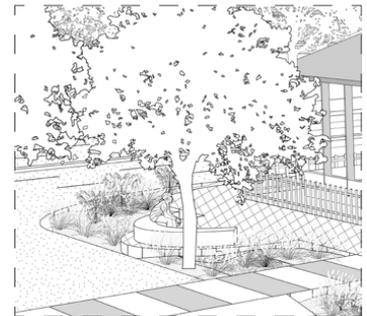
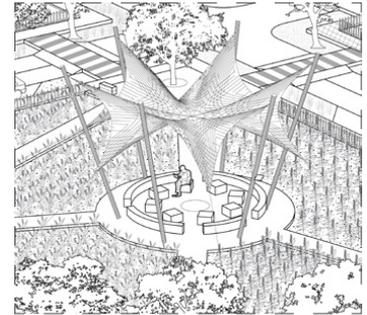
// View to Sector - from highrise building //



// Calculations for Self-Sustenance //

<p><b>Waste Water</b></p> <p>200-250 Liters of waste water per person per day</p> <p>150 Liters 75% 50 Liters 25%</p> <p><b>Grey Water</b></p> <p>1500000 Liters of Grey water generated every day in sector</p> <p>Bio-Swale with Plants like water hyacinth, Typha, Waterlily to purify Grey Water</p> <p>15 Acre of land can be irrigated in these much water</p>	<p><b>Organic Waste</b></p> <p>1.2 kg of organic waste per person per day</p> <p>12000 kg of organic waste generated every day in sector</p> <p><b>Composting</b></p> <p>It takes around 60 Days to convert Organic waste to compost</p> <p>From organic waste compost becomes ~15% of it</p> <p>1800 kg of compost can be generated from organic waste per day</p> <p>Need 5 ton of Compost per acre if taken 1/4 inch depth</p> <p>5000 kg of organic waste need 350 sq ft compost bin</p> <p>50400 sq ft of Compost space needed for the sector</p>	<p><b>Energy</b></p> <p>28.9 Kw of Electricity is used per person per month</p> <p>289000 kw of Electricity needed every month in sector</p> <p><b>Solar Energy</b></p> <p>Produces 280 to 320 Watts of electricity per hour (200 Watts * 7 hours of sunlight per day = 1400 Wh per day so, each panel can produce 63 Kw of electricity per month)</p> <p>Sector need 4587 Solar Panels to cater to the energy need of the sector</p> <p>7500 sqm of space required in sector to accommodate all solar panels</p>	<p><b>Food</b></p> <p>2300 calories needed per person per day</p> <p>100 sqm of land needed per person to produce the necessary calories</p> <p><b>Farming</b></p> <p>1000000 sqm of land needed in sector for Farming</p> <p>750000 sqm area of the sector</p>	<p><b>Biodiversity</b></p> <p>10 sqm of green land per person in the sector</p> <p><b>Urban Forest</b></p> <p>100000 sqm of urban forest within the sector to enhance the biodiversity of the sector</p> <p><b>Built Form</b></p> <p>110 sqm of Built Form per Household</p> <p>275000 sqm of space for the Built Form within the sector to cater the population</p>
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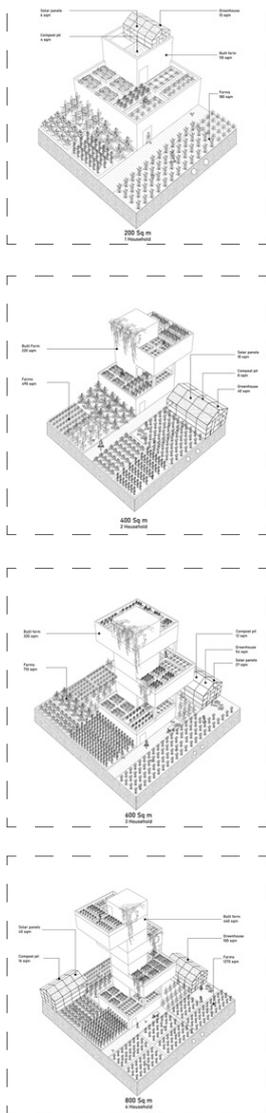
// Everyday life in sector //



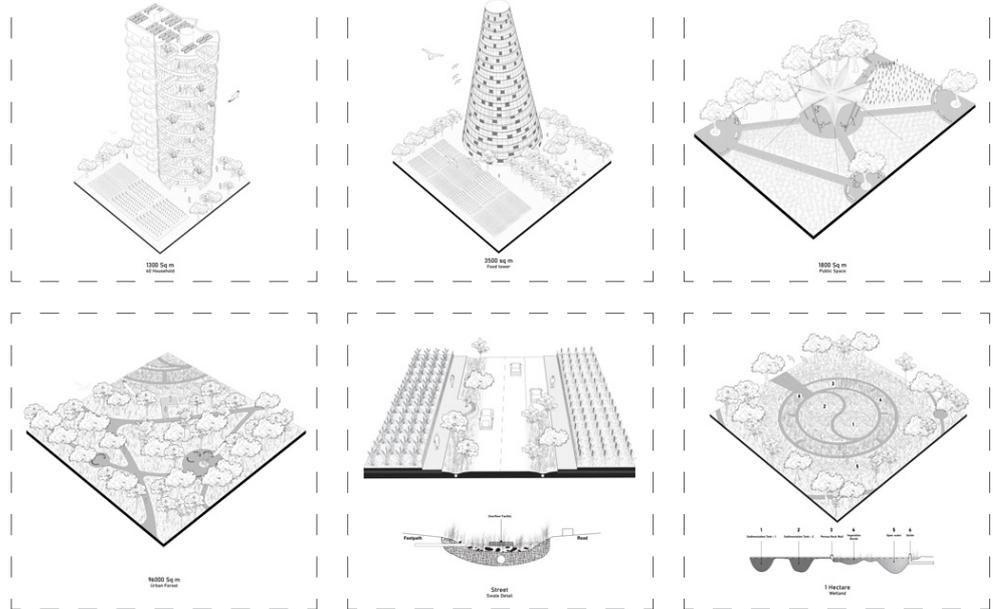
// Plan for Self-Sustenance //



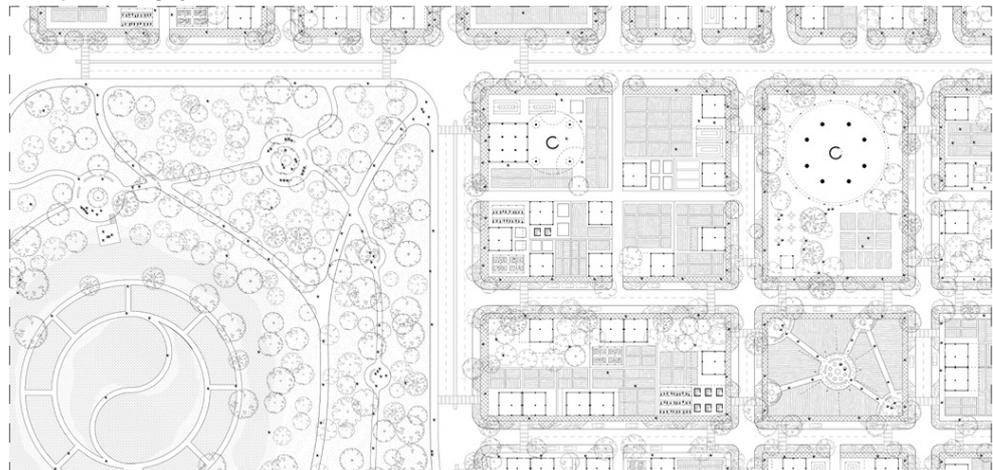
// Household Typologies //



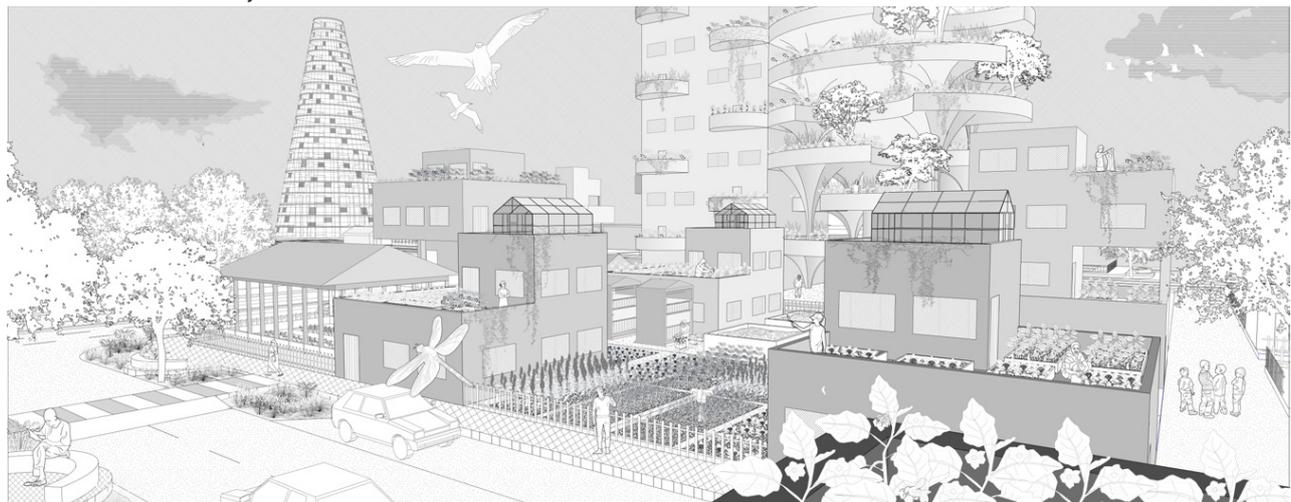
// Kit of parts //



// Part plan - Living Systems //



// View to Sector - from balcony //



This proposal aims to integrate living systems in the everyday life of the people in the city. Where you can see the housing typologies with farming areas, food towers, wetlands and forests as leisure spaces for citizens. An environment where barter system and community dining is an everyday thing. Where seeing and living with other beings is as normal as the outer greens of the city. And to me, this defines the next century's urban living where you have food security and access to nutrition at your doorstep and not just for humans but for other beings as well.

# BAIRA - FLOATING GARDENS

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**Anahita Jafar Abadi & Florian Opitz**

Norwegian University of Life Science (NMBU)

Bangladesh

**BUILDS TOP 10**

**KEYWORDS:** Floating Gardens, Traditional Ecological Knowledge (TEK), Bangladesh, Water hyacinth, Repurpose

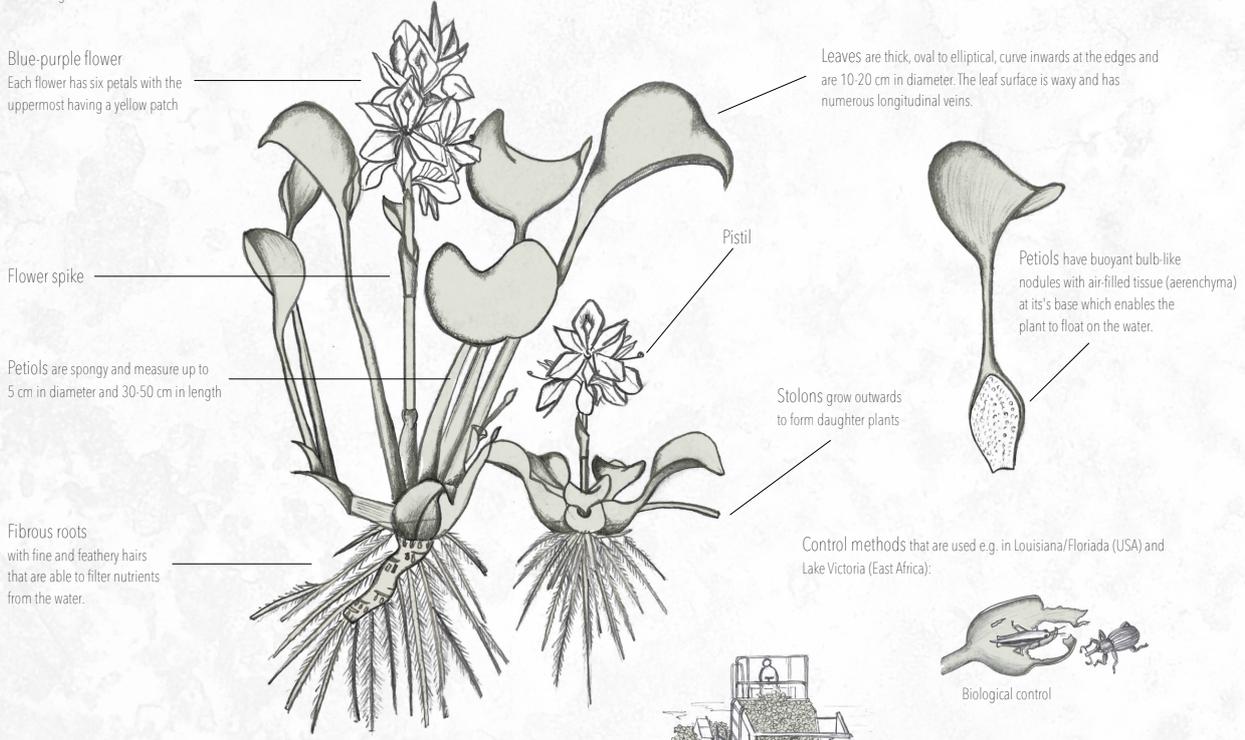
**ABSTRACT:**

Flooding is the norm in Bangladesh. During the monsoon and typhoon season, flooding occurs for as long as 8 months a year and makes farming very challenging. From these circumstances the technique of building Floating Gardens, called Bairas, emerged 300 to 400 years ago in the south of Bangladesh. By using layers of water hyacinths, farmers are able to build Floating Gardens which allow them to be independent of their farmland and grow vegetables and more during flooding.

This project explores the traditional ecological knowledge of the construction process of Bairas and focuses especially on the building material, the water hyacinth. Water hyacinths are highly invasive and can quickly form dense colonies that cover lakes and streams and greatly alter their biological function and usability. Therefore a common practice is to control their spread through physical, biological or chemical interventions, for example through the application of pesticides. Using water hyacinths as a resource by building floating rafts out of them opens up a whole new perspective. Suddenly their rapid production of biomass which is commonly perceived negatively turns into a great advantage and provides even more possibilities: Water hyacinths can help to clean water, woven together into rafts they provide habitat for birds and aquatic life, they can be used as a resource to generate biogas, as feedstock, weaving material or for land reclamation and erosion protection.

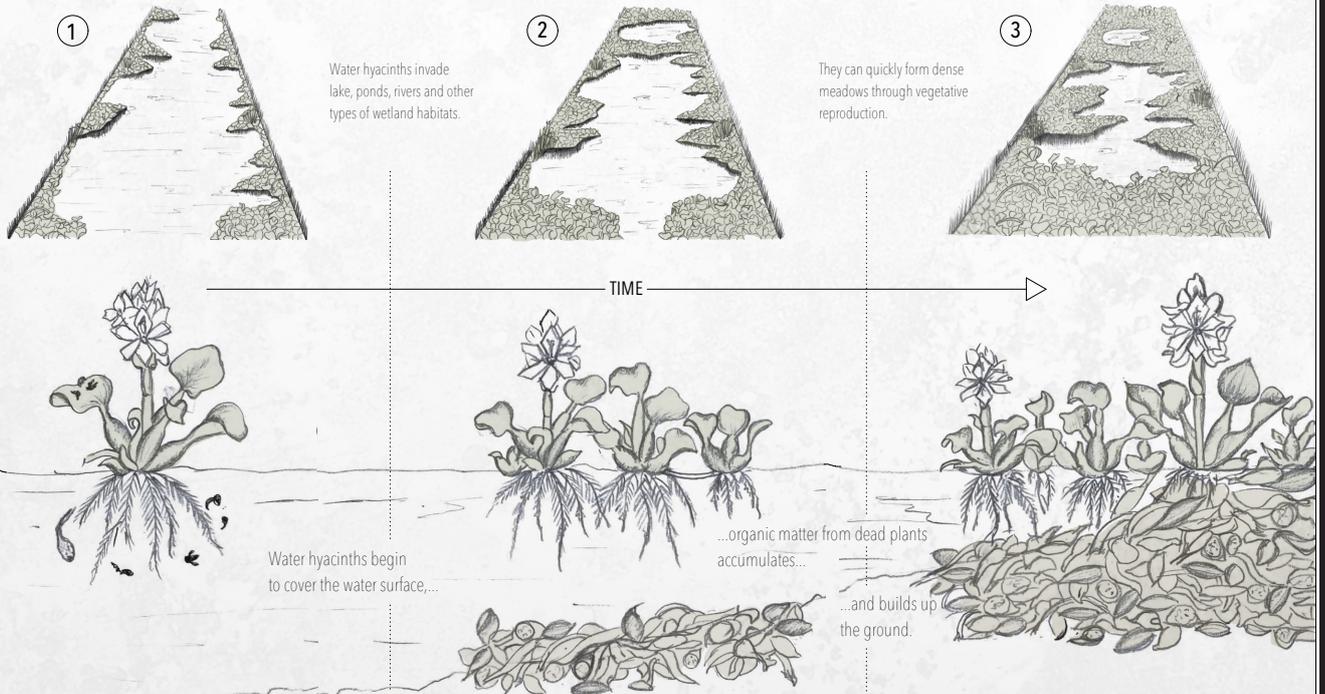
# Baira - Floating gardens

The water hyacinth (*Eichhornia crassipes*) is a free floating perennial plant that is native to South America (Amazon river basin). The plant grows in fresh water ecosystems and reaches heights of 0,5m to 1 m. It can tolerate extremes of water level fluctuation, nutrient availability, pH value, temperature, toxic substances and low salinity. The most favourable conditions are avg. temperatures between 14-29 °C, water pH value above 7, full sunlight and low salinity. There are two ways of reproduction: Sexual reproduction through seeds and vegetative reproduction through stolons. Stolons are short runner stems that radiate from the base of the plant to form daughter plants. Water hyacinths are often highly invasive outside their native range.



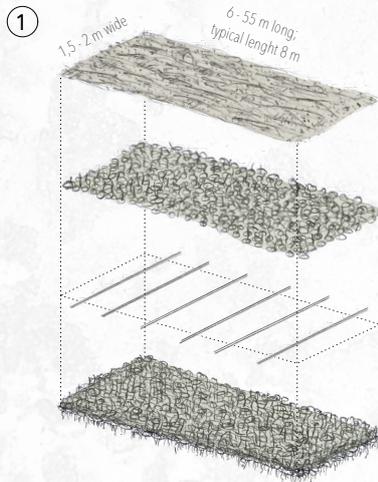
## Ecological threats and problems:

- // Water hyacinths grow quickly and form dense colonies that can double in size in approx. 2 weeks
- // They restrict light to the underwater environment, reduce the light availability for submersed plants and aquatic invertebrates
- // Dense colonies block air supply and reduce oxygen levels
- // Water hyacinths in great numbers make boating and fishing impossible



# Baira - Floating gardens

Flooding is the norm in Bangladesh. During the monsoon and typhoon season flooding occurs for as much as 8 months a year and makes farming on land mostly impossible. Adding to that a lot of areas are still waterlogged even when the floods recede. From these circumstances the technique of building floating gardens, called "baira", emerged 300 to 400 years ago in the south of Bangladesh, most common in the districts Gopalganj, Pirojpur and Barisal. In this way farmers are not dependent on dry land anymore. This page explores how bairas are made and what use they have in the local culture.

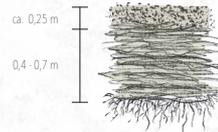
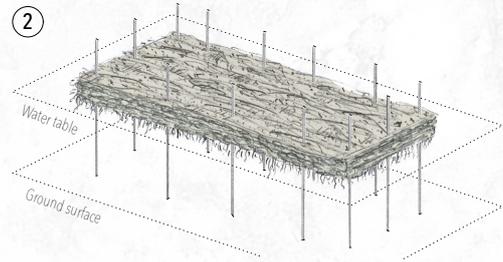


A top layer is spread over the raft. It can consist of soil, cow dung, compost, coconut husk etc.

In intervals of 8 to 10 days more layers of water hyacinth are added

Bamboo rods stabilise the raft in this phase and are removed later

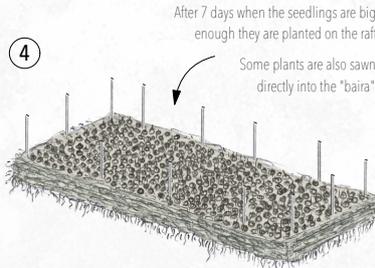
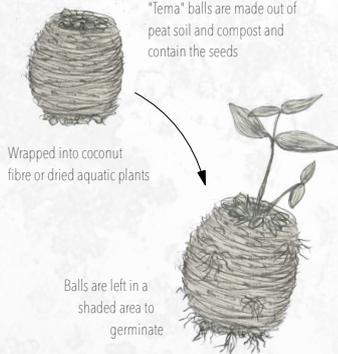
Water hyacinths (*Eichhornia crassipes*) are gathered and compacted into raft



The "baira" is anchored by sticking bamboo poles around it into the ground

Then the construction is allowed to rot for 15-30 days in the water to release nutrients as a preparation for growing crops on it

## 3 Preparing the seedlings:



Plant species:  
Cauliflower, tomato, okra, bitter/snake gourd, spinach, tumeric, ginger, beans, eggplant, carrots, radishes, squash, (red) amaranth, pumpkin etc.  
The bairas are also used for early cultivation of winter crops

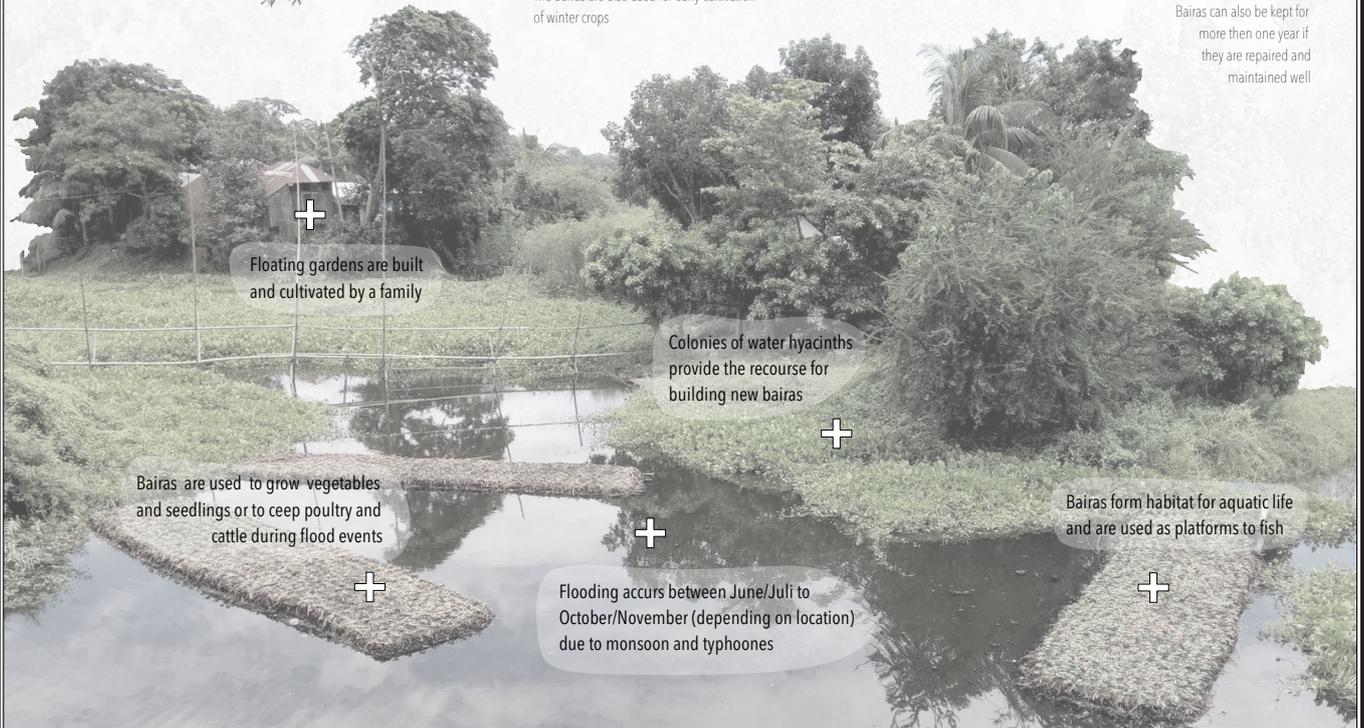
## 5 Vegetables are harvested and serve as food for the family or is sold at floating markets



## 6 Late autumn when floodwater recedes:

Bairas are either broken up and used as a fertiliser for growing wintercrops like turnip, cabbage, cauliflower, tomato, red amaranths etc.

Bairas can also be kept for more than one year if they are repaired and maintained well



Floating gardens are built and cultivated by a family

Colonies of water hyacinths provide the recourse for building new bairas

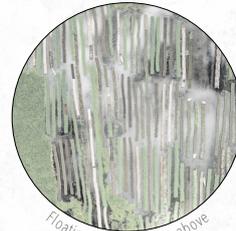
Bairas are used to grow vegetables and seedlings or to keep poultry and cattle during flood events

Bairas form habitat for aquatic life and are used as platforms to fish

Flooding occurs between June/July to October/November (depending on location) due to monsoon and typhoons

# Baira - Floating gardens

The seasonal farming cycle in the Barisal district in southern Bangladesh is very diverse. The upper part of the page shows how the year and life of the people is influenced by the high and low water season. The down part of the page explores possible applications of the concept of the floating gardens in different contexts and possible uses of the water hyacinth in general. The aim is to show the positive aspects of this plant when invasion has already happened as an antithesis to the control methods that are shown on page one.



Floating gardens from above

The economy in southern Bangladesh is based on farming and fishing.



Rice farming

Bangladesh is criss-crossed by rivers like in the Barisal district, which lies in the delta of the Padma (Ganga) and Jamuna river. Due to the regular flooding floating gardens are a strong part of the local culture.



Flooded village

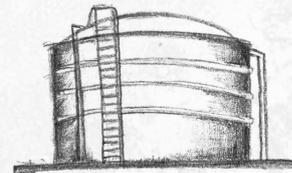
In the Barisal district, flooding occurs 2-4 times a year, submerging 30-50% of the villages and staying 3-10 days in the houses. Every few years "abnormal" floods take place where 100% of the villages are under water and building and roads are destroyed.

**1 Waste water treatment and clean-up of polluted environment**  
Water hyacinth has the potential to clean up various contaminated waters. The plant can absorb into its tissues large quantities of heavy metals from the water column.

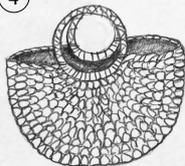


**2 Habitat for aquatic and bird life.**  
Large, thick floating islands of water hyacinth and its feathery roots can form habitats for birds and animals.

**3 As alternative fuel and energy source.**  
Water hyacinths found in various water ways can be harvested and serve as an alternative energy source. Water hyacinth biomass can be processed into convenient solid fuel pellets using briquetting technology or used to generate biogas.



**4 Semi-industrial uses and household articles.** Water hyacinth can be used in making ropes, baskets, mats, shoes and sandals, bags, wallets, vases, furniture etc.



**5 Animal feedstock and agricultural use.** Water hyacinth can be used as fodder for farm animals and as supplementary feed in fish farming. It can also be used as an organic fertilizer and in mushroom cultivation.



**6 Land reclamation and erosion protection.**  
As shown on page one, water hyacinths close up the water surface and accumulate huge quantities of dead organic matter that builds up the ground over time. Also they slow down wave energy and can act as a barrier between land and open water.

# LA CEIBA

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## **Lucila Aguilar de la Lama, Daniela Lujan Menchaca & Raúl de Villafranca Andrade**

Mexico

### **BUILDS Top 10**

KEYWORDS: Sustainability, Architecture, Industrial, Bamboo, Design

#### ABSTRACT:

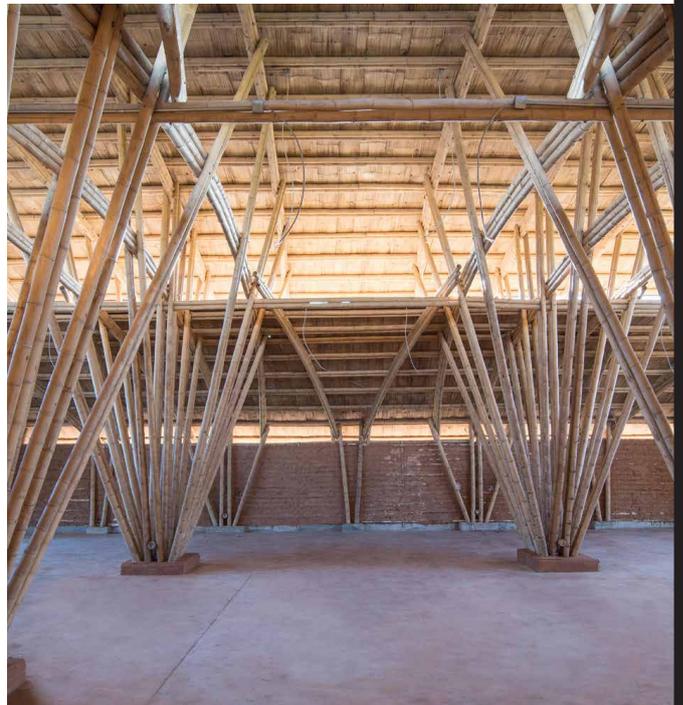
La Ceiba is a social infrastructure project developed for Uumbal, an agroforestry company located in the southeast of Mexico. The project introduces materials and design strategies that have a low environmental impact and high aesthetic quality while also meeting the needs for safety and operation. It demonstrates that industrial buildings can be in harmony with the environment. The project consists of 16 replicable prototypes such as warehouses, homes and guardhouses, among others.

During the construction process, the design team faced many challenges regarding the bamboo handling for construction. We realized that even though bamboo is abundant in the region and easy to use, there are not many workers qualified to build with bamboo. To address this problem, we made several detailed bamboo construction manuals that would not only help the workers build this particular project, but could reach many people in different parts of the country and make it easier for them to start exploring the possibilities of building with bamboo.

With La Ceiba we seek to generate a positive social impact. Natural materials such as earth and bamboo are mixed with conventional materials in an attractive and functional design, which responds to a bioclimatic strategy for warm-humid temperatures, and the constructions are strategically oriented to benefit from the winds and the position of the sun. In addition, they have a bamboo roof and vegetable cover that provide shade, comfort and harmony, and respect the dignity of the work of the Mexican countryside.

# LA CEIBA

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# LA CEIBA



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Through this manuals, that we shared though our website, we aspire to reach a large number of people and theach the world about the benefits of this wonderful material.

# LA CEIBA



With La Ceiba we seek to generate a positive social impact. Natural materials such as earth and bamboo are mixed with conventional materials in an attractive and functional design. The proposal promotes dry construction and the use of resources that can be useful beyond the life of the building. The design responds to a bioclimatic strategy for warm-humid temperatures, and the constructions are strategically oriented to benefit from the winds and the position of the sun. In addition, they have a bamboo roof and vegetable cover that provide shade, comfort and harmony, and respect the dignity of the work of the Mexican countryside.



# URBAN OASIS

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**Sulâni Kurtz**

Brazil

**BUILDs Top 10**

**KEYWORDS:** Degraded Spaces, Urban Development, Sustainable Development, Regenerative Landscape, Reuse

**ABSTRACT:**

Urban Oasis is an investigation of the potential for degraded urban spaces to become catalysts of the changes needed for the future of humanity. The Project proposes a transformation on the area of Company of Silos and Warehouses (CESA) located in Passo Fundo, Rio Grande do Sul – Brazil, currently deactivated and unoccupied, into a park, a green laboratory for the city, that provides a place for practical and sustainable activities, that involves three aspects: social, environmental, and economic. Therefore, the Silo, which conserved grains in its industrial past, will become a space that conserves the environment and the future. The area has a strong connection with the city center of Passo Fundo, and it is easy to access, and there are attractive views of the skyline of the urban center. So thinking globally and acting locally, it was considered pertinent to use a degraded and abandoned space, which has been part of the urban landscape for 60 years. Therefore, both the area and the built heritage are regenerated, recycled and reactivated through programs that combine sustainability with community, transforming it into a living space, rich in social and environmental biodiversity, an Oasis in the middle of the city.



# URBAN OASIS

A GREEN LABORATORY FOR THE CITY

## PROPOSAL LOCATION



## INTERVENTION AREA



## SILO - CESA | TIMELINE



## HOW CAN ARCHITECTURE SHAPE A BETTER FUTURE?



TAKING CARE OF THE FUTURE OF NATURE, CITIES AND PEOPLE...

AN URBAN SPACE RICH IN SOCIAL AND ENVIRONMENTAL BIODIVERSITY!

## THEME

The proposal investigates the potential of degraded and abandoned spaces in the urban fabric, as catalyzing spaces for the future we want, in balance with social, environmental and economic dimensions. The space called Urban Oasis intends to explore the area mainly with regard to the construction of a sustainable space, with the use of preexistence, energy generation, knowledge, information, research and regeneration of fauna and flora, also being concerned with the dynamics of space and its surroundings, creating a space for everyone.

## FUNCTION

The project is an epicenter of sustainable practices that aims to make Passo Fundo a greener city for everyone. A planning model for sustainable development is about meeting the needs of the present, without compromising the capacity of future generations according to their needs. It's planning today so that tomorrow still exists. Thus, this space, located in the urban center, intends to change the logic of thinking, living, producing and consuming, as the change must start from the inside out, starting from the cities.

## CONCEPT

Exploring the capacity of abandoned spaces to capture the transformation needed today, the proposal brings the force of subversion, of an industrial space into an environmental space. The intervention area, which is currently degraded and abandoned, is transformed into an Urban Oasis, a space rich in biodiversity, social and environmental, an oasis in the middle of the city. The space takes care of the needs of the present, without compromising the needs of the future, with sustainable actions. This is the mark

the space wants to leave for future generations. The presence of the nature and character of the project, implemented in the central area of the city, aims to be an epicenter of sustainable practices, which guide Passo Fundo and the Region towards sustainable development, and thus serve as an example for other measures that rethink the human impact on nature. The purpose of the program is the immersion and reflection of the community, for awareness, and in this way, joint alternatives are built for a better future.

## WHAT IS THE FUTURE WE WANT TO BUILD? WHICH MARK WILL WE LEAVE?

## TARGET AUDIENCE

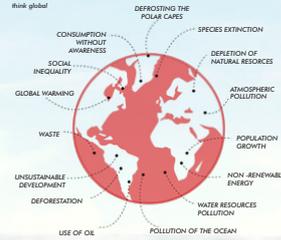
The project serves the entire Passo Fundo community and region in order to raise awareness, as well as offering a public space rich in experiences connecting with nature and the city of Passo Fundo.

## PRE-EXISTENCE

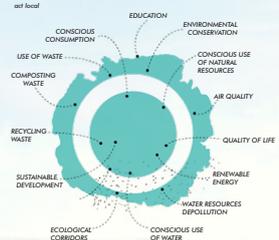
The presence of the project will be a constant reminder of the capacity for change that industrial spaces can provide in cities, in this case, the space that previously conserved grain will conserve the environment.

## AN OASIS IN THE MIDDLE OF THE CITY...

## HUMAN IMPACTS ON EARTH



## FUTURE WE WANT - OUR MARK



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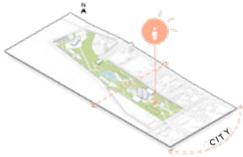
RESPONSIVE DESIGN WITH NATURE  
CITIES WITH NATURE  
SYMPOSIUM



# URBAN OASIS

A GREEN LABORATORY FOR THE CITY

## PROJECTUAL INTENTIONS / terrain and surrounding considerations



### VOCATION - IMMERSIVE

The proposal takes into account the vocation of the project's surroundings. Thus, Sector A, which has the greatest connection with Avenue Brasil, and will be the entrance to the Park, will start by inserting activities involving immersion in the environmental theme, such as education, research, exhibition and space for discussion of ideas, in order to raise awareness among users.



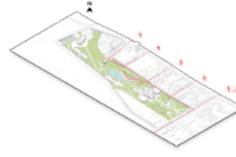
### VOCATION - CONTEMPLATIVE

At the center, contemplation activities are proposed, which are already linked to the existence of a much-visited spot for the beautiful views of the city. It is in this sector that the Lake and the Educational Nursery are located, with the park's landscape species, the Playground and Academy, which intend to offer support to the user.



### VOCATION - COMMUNATIVE

At the other end, there are activities that engage the community that lives in Patrologia in practice spaces, such as the vertical community garden, the waste space, which handles all the waste from the Park and Expositos, and the Multiuse space, which intends to make room for the most varied outdoor activities.



### PERMEABILITY

The park intends to please connections with the existing urban fabric, which the area does not have today. Thus, the highlights are the connections with users in the surroundings, favoring walkability, in order to expand access through the topography, the relocation of occupation and the connection of the Linear Park.



### VISUALS

The Park preserves the urban landscape present in the intervention site in relation to the pre-existence and also to the city of Passo Fundo. Thus, the buildings and paths keep the view, and provide others, as they extend across the land. Thus helping to create a common identity with the city's space.

## THINK GLOBAL ACT LOCAL!

### WASTE SPACE

Area that takes care of waste from the Park Urban Oasis, collected from buildings, dumps and recycling bins around the site, where organic waste will be composted to be transformed into fertilizer, and recycled waste.

### VEGETABLE GARDEN

The community garden is a space where the community will have contact with the cultivation of plants through the hydroponics system, with the aim of encouraging domestic production, healthy eating, and also productive landscaping.

### PARKING

For cars and buses.

### EKOPOINT

Collector of recyclable and reusable waste, such as Plastic, Paper, Glass and Metal, in addition to Lamps, Batteries and Electronics, which are sent to the Recyclable Waste Space, and then to their correct destination.

### OUTDOOR ACADEMY

Installation with exercise equipment.

### USER CENTER

Space with toilets, guardhouse and information about the Park, as well as a covered space with tables.

### PLAYGROUND

### EDUCATIONAL PAVILION

In this space, environmental education activities will be developed, such as recycling workshops, composting, lectures, thus, a space for teaching environmental and sustainable practices.

### AMPHITHEATER

Open venue for meetings, debates and events, with a capacity for 300 people.

### FORUM

Space with 2 rooms for 120 people, or a room for 260 people, for holding debates, meetings and events that need a covered space.

### AVENUE BRASIL

Main arterial road in the city of Passo Fundo and main pedestrian access to the Park.

### RAIN TREES

Metal structures that capture water through its roof, which lead to the lake, and form a covered area for events.

### BALCONIES TO THE WEST

Space for viewing the Sunset, as well as a grandstand for the Multipurpose Space.

### HIGH DECK

Space that extends the public walkway with the views of the city area, towards the Mirante.

### ORCHARD

Space with fruit trees, which will be available to the community and also to the avifauna.

### VIEWPOINT AND COFFEE

The viewpoint preserves the view of Sélmo Céu, of the city of Passo Fundo, and also offers a café on the lower floor, which is connected to the Parque Oásis Urbano, through a panoramic elevator, to overcome the great unevenness.

### LAKE WITH AQUATIC PLANTS

Lake with the presence of aquatic plant species, which reinforce the concept of Oasis. The space also helps with soil permeability, humidification and biodiversity, as well as acting as a water reservoir for the Park.

### EDUCATIONAL NURSERY

Environment for the production and rustication of plants that are part of the Park's landscaping, so that they create resistance before their effective implantation. Through the facade of this building, it also connects with the linear park Oasis Urbano.

### RESEARCH INSTITUTE

Space for the production of scientific research in the ogeographical area, with associated laboratories for the production of knowledge and evidence.

### SILO MUSEUM

Reuse of the silo with multimedia exhibitions that stimulate ideas, explorations, reflections, questions and answers to reflect on how we (human beings) want to live - our relationship with the planet and between us and, our impact on the Past, Present and Future.

### BUS STOP

Access to public transport of the main access in the area.

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# URBAN OASIS

A GREEN LABORATORY FOR THE CITY

BRINGING NATURE TO THE CITY...

## REGENERATIVE LANDSCAPE / expanding diversity

Landscaping is important for the production of social welfare, recreation, and also, for its functional capacity, being a source of food for birds, absorbing carbon dioxide, and other polluting gases. Vegetation is like a lung in cities, reducing the effect of heat islands, as green areas produce photosynthesis and can still reduce 85% of solar radiation, in addition to improving air and water quality. In this way, Regenerative Landscaping acts by reinforcing these characteristics, as it proposes the regeneration of a degraded space through native plants, natural from the insertion site, which are already inserted in every ecosystem, from fauna to flora. In the case of the project, the corresponding Biome is the Atlantic Forest and the objective of the trees is to generate green spaces for people. These plants are easy to grow, adapt to the region's rainfall, do not need much irrigation, and are already part of the fauna, maintaining the ecological balance of the place and environmental preservation. Exotic species are also used, but they are much more aimed at the ornamentation of the Park.

## SECTORES / CONSTRUCTING LANDSCAPE

With the division of Urban Oasis Park into sectors, with the objective of working in the linearity of the land, in order to progressively immerse users in the environmental theme and in the Park's activities, Landscaping also offers differentiation between sectors. Sector A - Immersive, is the beginning of the user's journey, and where the Silo (imposing preexistence) is concentrated, so we opted for a more permeable landscaping, with low height and slender trees, such as the Alamo and the Herb - Mate. In Sector B - Contemplative is where landscaping begins to present a greater presence in the landscape, with colorful trees, with denser and more open crowns and with aquatic plants in the lake. In Sector C - Communativa, the focus is on productive landscaping, from the orchard, for the community, and the landscaping of the degraded hillside area, with native species.



SECTOR A - IMMERSIVE



SECTOR B - CONTEMPLATIVE



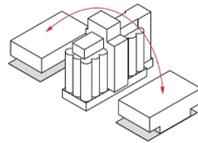
SECTOR C - COMMUNATIVE



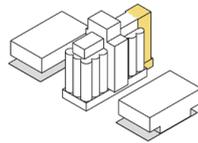
## SILO MUSEUM | helping society to review its priorities

The buildings that are inserted in this sector A - Immersive, such as the Silo, the Educational Pavilion and the Research Institute, intend to immerse the user in the context of sustainability. The Silo is recycled and becomes a Science Museum, adapted to rethink the Past, Present and Future. Outwardly, it conserves its materiality and brutality, adding only vegetation. The two buildings beside it stand out for their counterpoint, they are symmetrical, permeable and light.

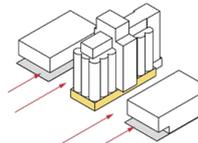
The silo is a Science Museum, focusing on digital media, and exhibitions that rethink our Past, Present and Future. To demonstrate the intent of the transformation proposal, users are invited to explore the space through the Central Atrium, where several cells were joined to build a space for everyone. From there, the walkways and the panoramic elevator distribute the visitors between the exhibitions. On the top floor, there is the coffee shop of the city where everyone can enjoy beautiful views of the city of Passo Fundo.



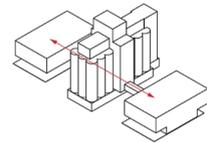
SYMMETRIC VOLUMES



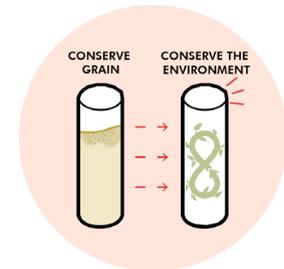
ANNEX - EMERGENCY LADDER



PERMEABLE AND FREE GROUND FLOOR



CONNECTION



12S2V9

RESPONSIVE DESIGN WITH NATURE CITIES SYMPOSIUM

# IXUA - PALENQUE VILLAGE

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**Lucila Aguilar, Miguel Ruiz Velasco, Miguel Ángel Vargas, Cassandra Esteve & Fabián Tron**

Mexico

**BUILDS Top 10**

KEYWORDS: Sustainability, Architecture, Urban, Bamboo, Design

## ABSTRACT:

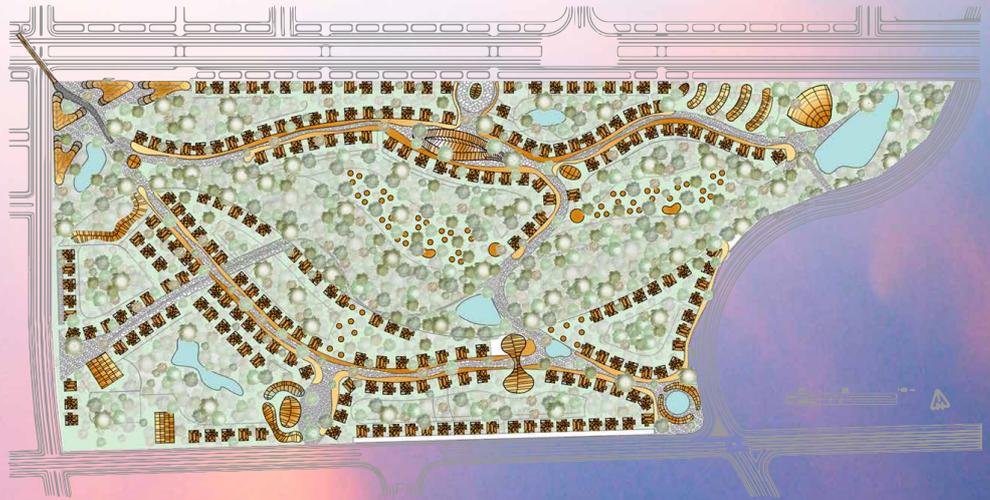
Ixua is a magical village that intertwines with the jungle at the foot of the Mayan Train tracks, the tourist route that connects the southeast of Mexico. The visitors, arriving in Palenque, suddenly find themselves in the first community built entirely out of bamboo. With its magical markets, restaurants and hotels, Ixua envelops travelers and inhabitants in the ancestral colors and flavors of the region.

More than just an architectural project, Ixua is the seed of a scalable movement towards a more sustainable planet, which guarantees natural wealth, economic prosperity and social justice for current and future generations. Bamboo is central to this vision: it grows quickly, and in the process, it cleanses the water and fertilizes the soils. It regenerates after being harvested and continues to capture CO2 from the atmosphere. Its abundance in many different environments and the simplicity of its use in construction makes bamboo an accessible material.

Ixua exposes to the world the structural and ecological value of bamboo, while nourishing the area with economic vitality. It harmonizes our enormous natural and cultural wealth with the desire for an inclusive Mexico that looks responsibly towards the future.

# IXUA - Palenque Village

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B4MB00

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B4MB00

# META DELTA\_BOTANICAL GARDEN 2.0

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## **Calina Bogasiu**

UAUIM University of Architecture and Urban Planning Ion  
Mincu

Romania

## **BUILDS Top 10**

KEYWORDS: Urban Nature, Wetlands, Research Center, Transitions

### ABSTRACT:

The project is a reflection on how to create a synergy between nature and technology and change the way people relate to nature in the city. It addresses a more advanced understanding of the human-nature relationship in which architecture has the opportunity to integrate into an ecosystem by proposing an artificial object.

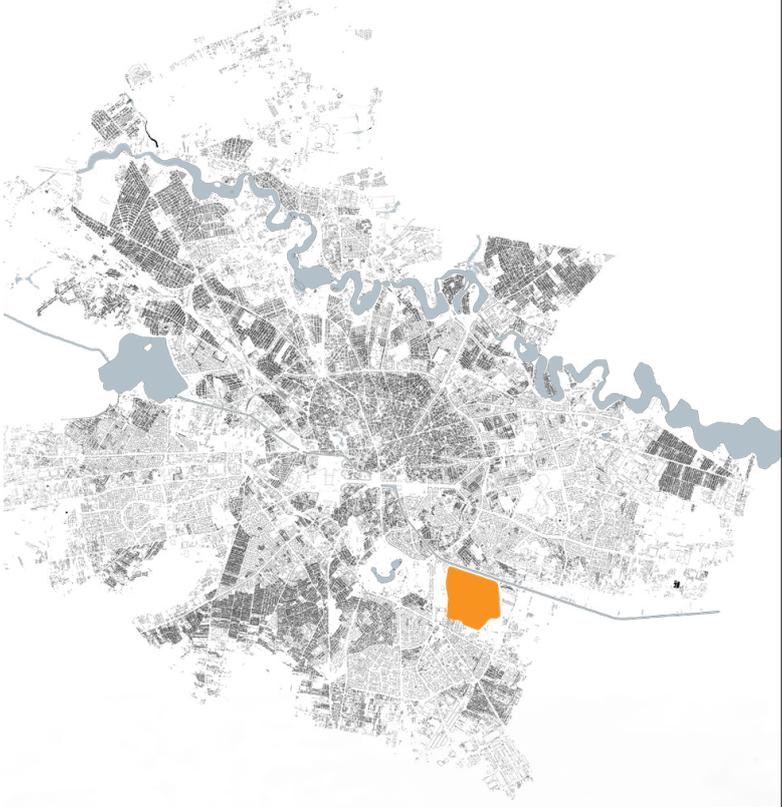
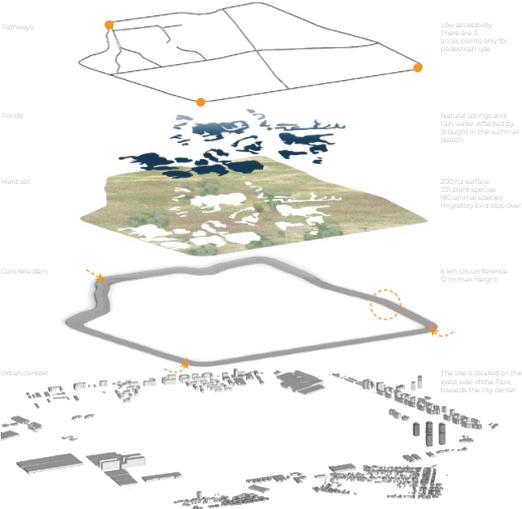
The case study is a protected natural reserve in the city of Bucharest, Romania. The issue was how to preserve urban nature while integrating it into the urban system.

The project was built around the concept of the terrain vague - the intermediate, undifferentiated, unused space that exists in the urban fabric of post-industrial cities.

Văcărești Natural Park in South-East Bucharest is an abandoned artificial lake built in the '80s as part of the communist hydro-technical projects on the Dâmbovița River. It is enclosed by a concrete dam that discouraged human presence for 40 years, so nature reclaimed the territory and created a diverse ecosystem of wetland flora and fauna.

The project reinterprets the typology of the botanical garden, which traditionally combines science and leisure, and is comprised of a landscaped planted area and various buildings, including green-houses, pavilions, and follies. In this case, the green area is a man-made space reclaimed by wild nature, which is to be left untouched. The program is inserted into a building that grows from the former lake's infrastructure and houses a wetland research center and visiting center.

transition between nature and the city



# Meta Delta \_ Botanical Garden 2.0

The project addresses the issue of ecosystems in the city environment on urban scale. The case study is a protected natural reserve in the city of Bucharest, Romania. The issue was how to preserve the urban nature while integrating it into the urban system.

**The site**  
Văcărești Natural Park in South-East Bucharest is an abandoned artificial lake built in the 80's as part of the communist hydrotechnical projects on the Dâmbovița River. It is enclosed by a concrete dam that discouraged human presence for 40 years, so nature reclaimed the territory and created a diverse ecosystem of wetland flora and fauna.

**The Terrain Vague**  
The project was built around the concept of the terrain vague - the intermediate, undifferentiated, unused space that exists in the urban fabric of post-industrial cities.

The Botanical Garden of the 21<sup>st</sup> Century?

In a moment of dramatic environmental transformation and permanent economic uncertainty, the project is a reflection on how to create a synergy between nature and technology and change the way people relate to nature in the city. It addresses a more advanced understanding of the human-nature relationship in which architecture has the opportunity to integrate into an ecosystem by proposing an artificial object.

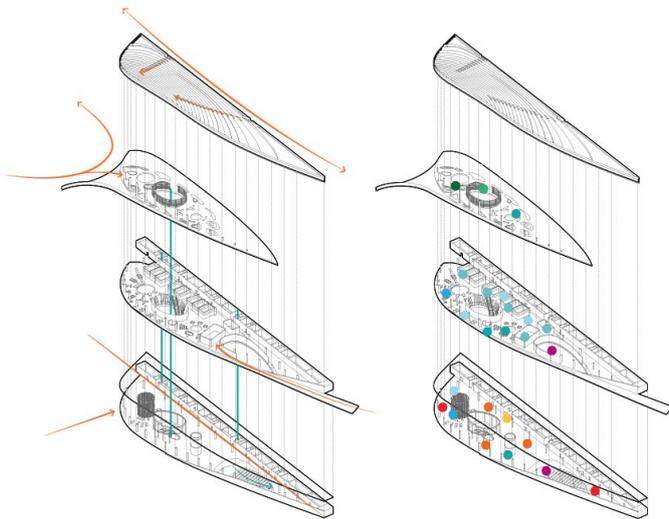
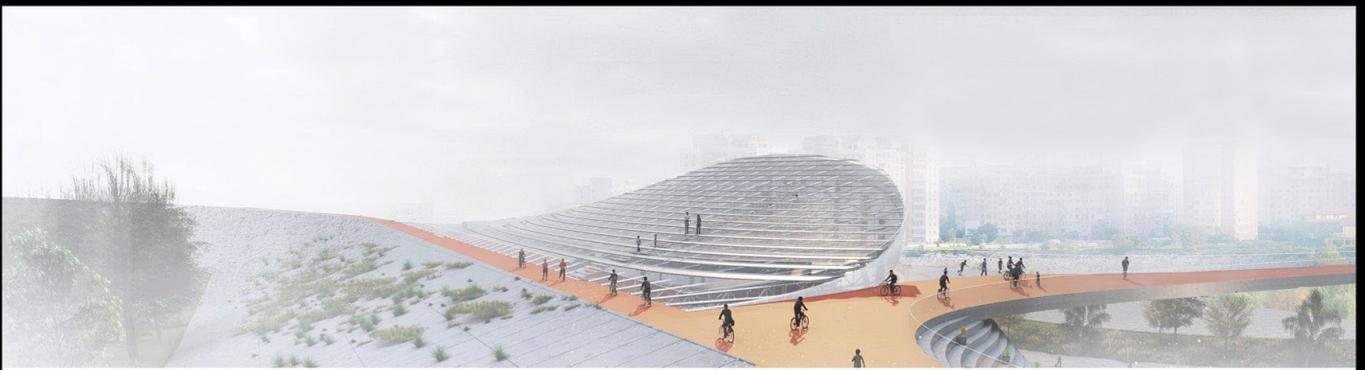
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The strategy is shaped by introducing the relationship of audience and actor into the site by creating as many visual connections as possible. A reinterpretation of the Romantic vision of wandering and grasping for the spectacle of nature.



RESPONSIVE CITIES DESIGN WITH NATURE SYMPOSIUM

C33LA3



- Popularity
- Urban
- Green Phase
- Library
- Meeting room
- Office area
- Exhibition
- Laboratory
- Lecture hall
- Grounding area
- Library
- Popularity
- Exhibition area
- Office
- Lecture hall
- Cafe

Circulation Diagram

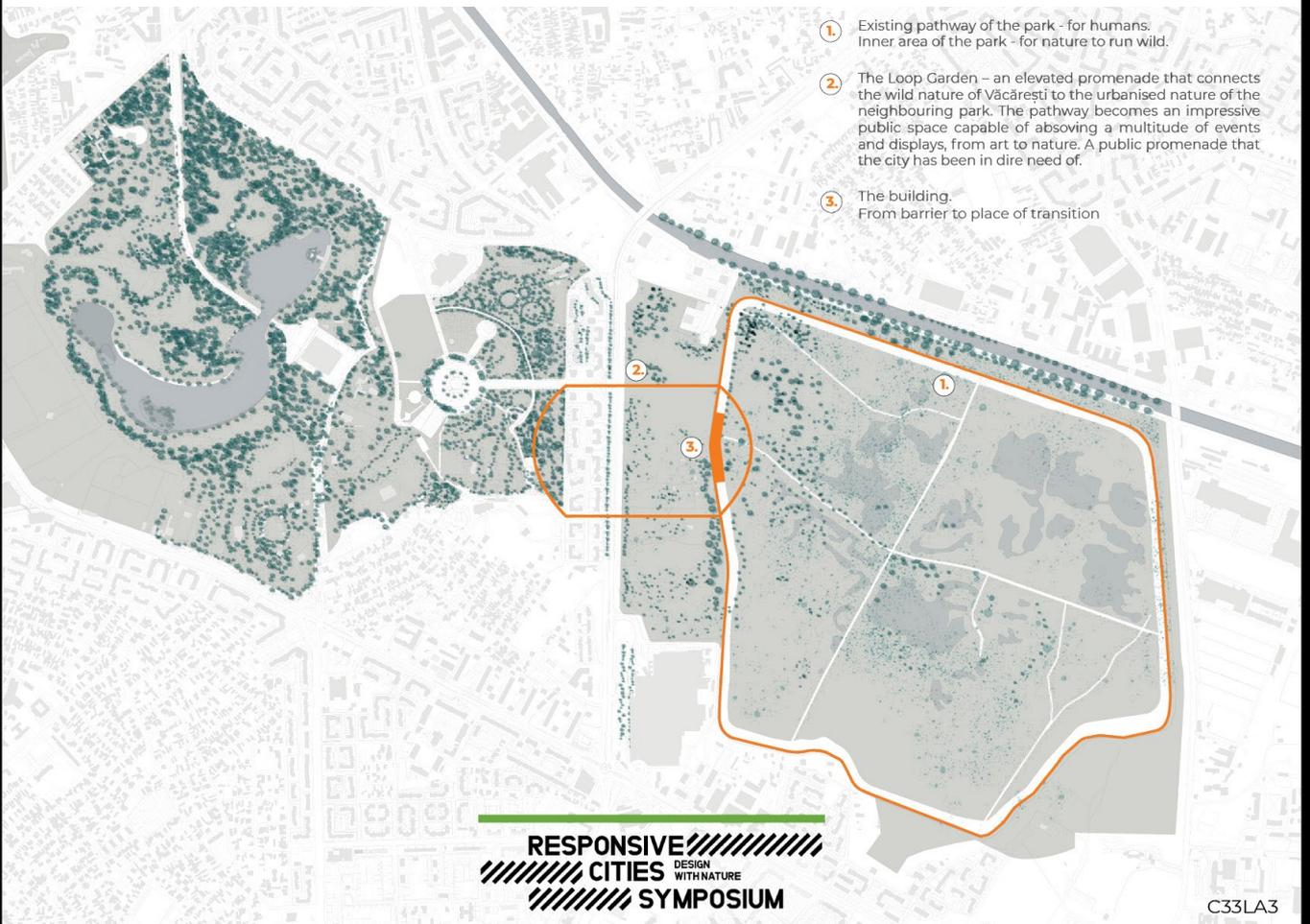
Program Diagram

### The Urban Strategy

Vacărești is located in the periphery of the city, isolated by its close context, although it is at a short distance from other big parks of the city. In this master plan, I proposed a way of connecting these two green areas via an elevated pathway called The Loop Garden - between two types of attitude towards nature: the urbanised park of the '70s and the wild nature of the 21<sup>st</sup> century city.

### The Building

The projects aim is to create the opportunity for the public realm to get activated and transformed through **a delicate and intricate architectural intervention** that connects, enhances, and cherishes the special qualities of the environment. The building is a subtle alteration in the shape of the landscape, a lifting of the surface that creates **a space of transition between nature and the city**. Its goal is to accommodate function inside while being crossed and surrounded by public space. The building morphs and intersects with the landscape. It's complex roofing system houses three stories. It is rooted in the dam and reveals itself towards the city through a generous transparent facade.



**RESPONSIVE**  
DESIGN  
**CITIES WITH NATURE**  
**SYMPOSIUM**

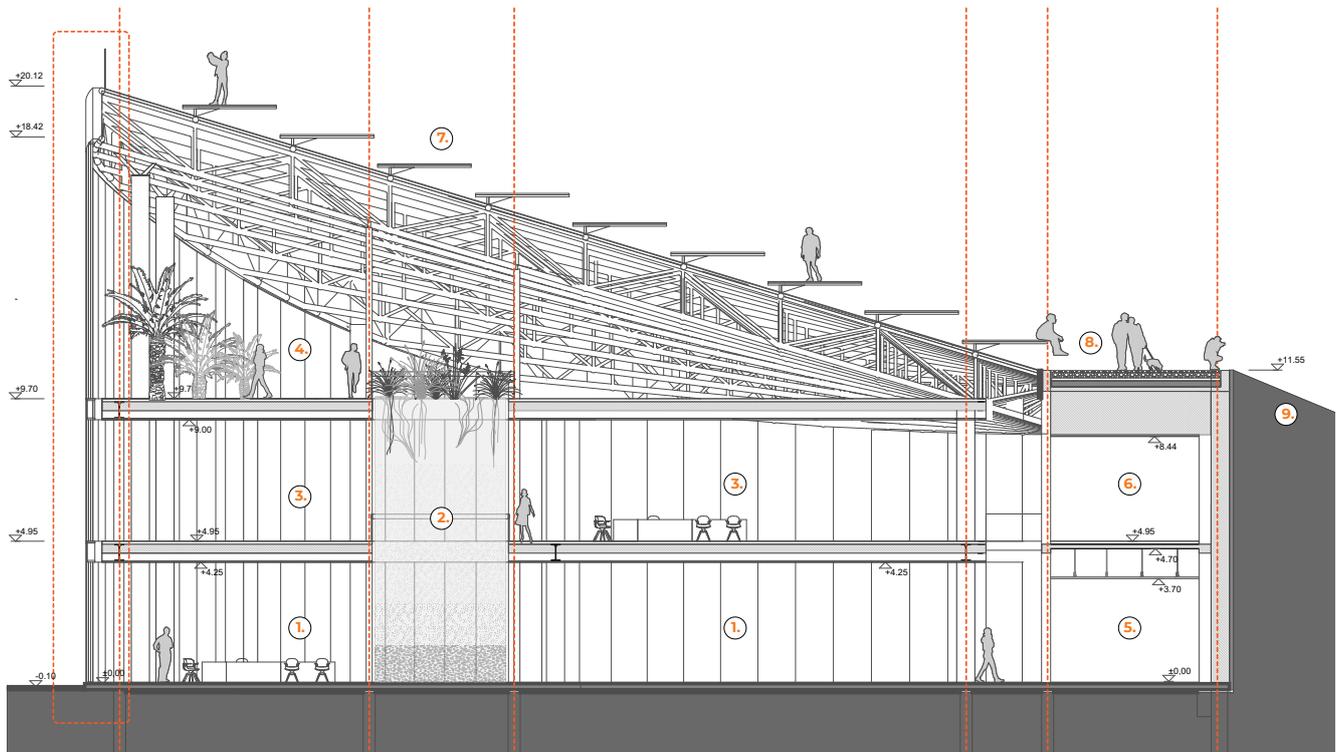
C33LA3



The green-house is the core of the project: Science, education and leisure.

The program is clearly divided between the three floors, the ground floor is the place of engagement, exhibition and study dedicated to the public, the everyday visitors; the second floor positioned inbetween the greenhouse and the public level serves as the space dedicated to the research centre and specialized laboratories. The three levels are perforated by three circular assets, the first is represented by the cylindrical library a place of rendez-vous between the academia and the public, the second one is the central atrium which allows the public to transition towards the greenhouse; the third one is a circular section of the actual layers of the Delta, presenting to the public the strata's that allow this natural reserve to function.

- 1. Lobby/ Exhibition area
- 2. Aquarium showcasing wetland layers
- 3. Labs/ Workspace/ Library
- 4. Green-house
- 5. Ticket area/ technical spaces
- 6. Technical spaces
- 7. Roof Terrace
- 8. Dam promenade
- 9. Interior Dam



# JELI-JELI

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**Byron Esteban Cadena Campos, Carlos Andrés Valverde Arias, Kevin Rafael Guerrero Valencia, Carlos Eduardo Larios Tepe**

ON-A Laboratorio de Arquitectura  
Senegal

## **BUILDS Top 10**

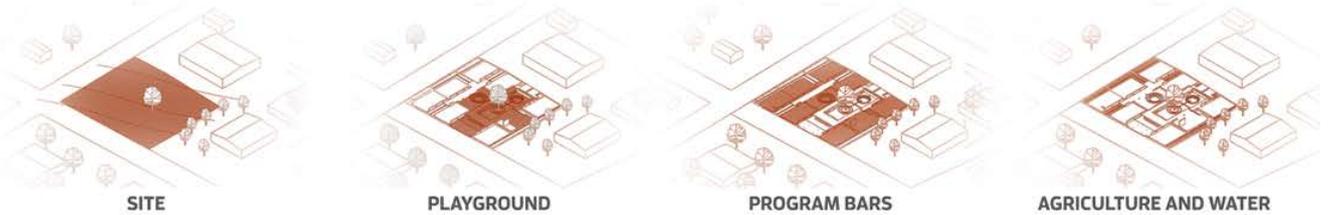
**KEYWORDS:** Learning By Doing, Local Construction, User's Empowerment, Community, Collective Intelligence

### **ABSTRACT:**

The Jeli-Jeli is a project inspired on Senegal and takes place in the city of Marssasum. Inside this Islamic community, there is a form of art that have flourished throughout the country which is based on the transferring of knowledge and culture from elders to children and adolescents by telling stories. Since its people comes from a very poor social strata, they value more the teaching of daily chores instead of letting kids going to school having an 80% of school dropout rate. Understanding this context, the project mixes the importance of studying and the local traditions of trading presenting a place where the community can join together and learn; the countryside lifestyle have been brought to the school adding vegetable gardens and green areas to encourage the know-how of learning.

The project has innovated traditional construction techniques using walling, foundation with tires and cyclopean concrete, columns, wooden beams, cut cane panel, zinc roofs, thermal conditioning, water collection, reuse of waste and food production. Besides, to keep the connection with nature, it was built around an existing tree with a simple composition of 3 programmatic strips, it has closed and semi-open spaces for 7 classroom modules with greenhouse gardens all connected by a drip irrigation system, the interior space is flexible and can be used for workshops, fairs, shelters, communal assemblies, etc. It articulates spaces and knowledge through collective actions and the community is empowered by the school program.

## EXTERIOR FACADE-CONTEXT



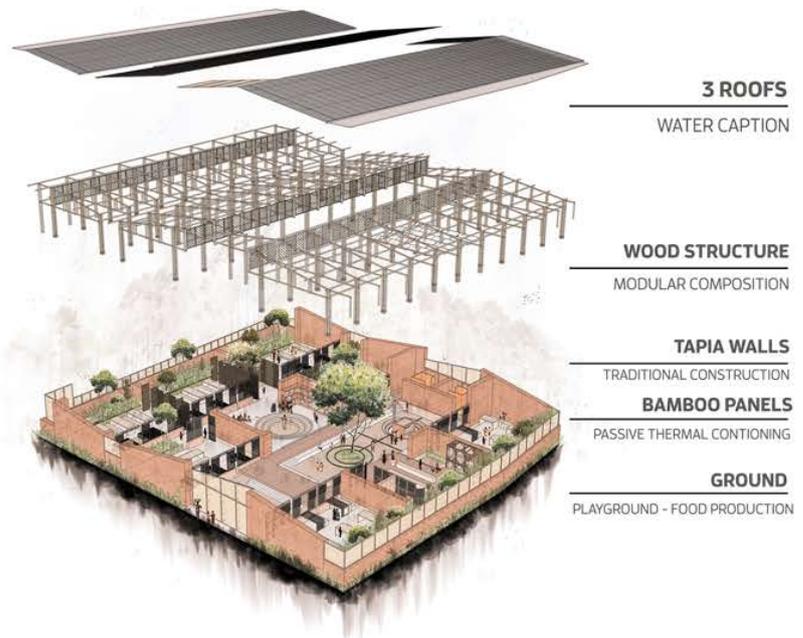
# JELI-JELI

This project is not just as a school, is the Jeli-Jeli, a storyteller, the place inside the community where children, teachers, seniors and mothers meet to learn and experience together. The idea of Jeli-Jeli is of great importance to Senegal for its customs; here elders are the ones who transmit knowledge and the culture to children and adolescents through stories, this is a collective effort and an art form that has flourished throughout the country.



The project is located in the city of Marssasum. In this place the majority of the community is Islamic and has a variety of customs marked by a very poor social stratum. For this group of people, it is more important to teach daily chores to children over letting them go to school; this fact results in an 80% of school dropout rate.

## CONSTRUCTION MODEL





ENTRANCE

This background allowed us to understand that any institution in this context must have an added value, it must include the community and focus on a program based on practicing traditions and trades. For this reason, this work aims to transport the countryside's life to the classrooms, adding vegetable gardens and green areas to encourage the know-how of learning.



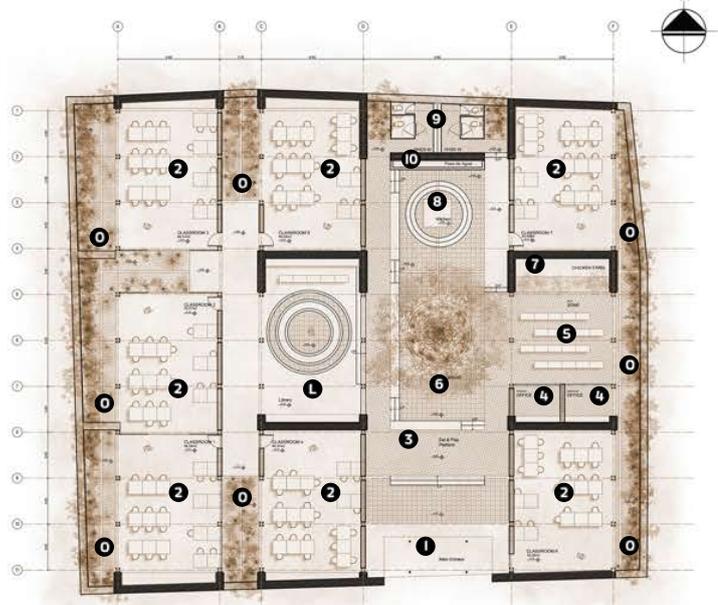
TRANSVERSAL SECTION



LONGITUDINAL SECTION

Furthermore, in its structure, the vegetation seeks to protect and filter the natural light and it will refresh and liven up the interior of the school.

FLOOR LEVEL



- 1 ENTRANCE HALL
- 2 CLASSROOM
- 3 PLAY & EAT
- 4 OFFICES
- 5 REST ZONE
- 6 PLAYGROUND
- 7 FARM
- 8 KITCHEN
- 9 BATHROOMS
- 10 WATER HOLE
- L LIBRARY
- O ORCHARD

FRONT FACADE



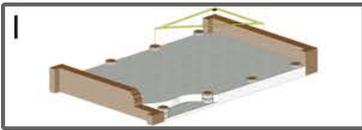
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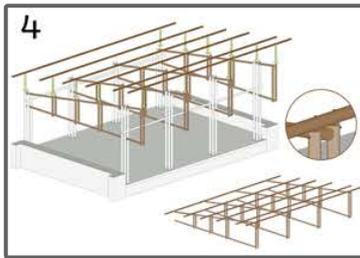
**CLASSROOM**

**CONSTRUCTION MANUAL**

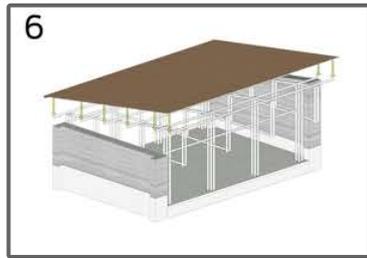
SQUARING, LAYOUT AND CONSOLIDATION OF FOUNDATIONS



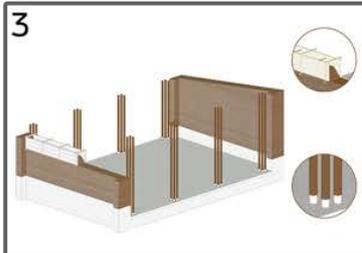
CASTING OF CONCRETE SLAB AND PLACEMENT OF METAL ANCHORS FOR COLUMNS



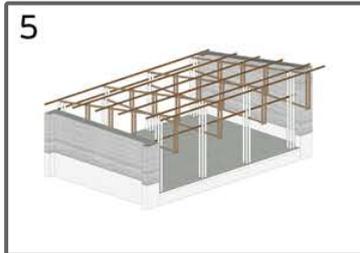
ARMING AND PLACEMENT OF BEAMS VI WOOD Ø10 CM



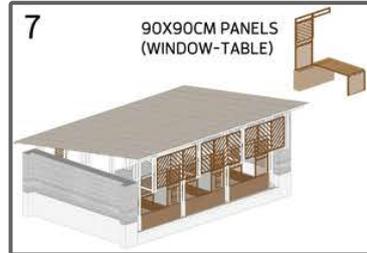
PLACEMENT OF ZINC COVER



BOLTED FIXATION OF COLOMUNAS



PLACEMENT OF WOODEN V2 BEAM Ø10CM



CONSOLIDATION OF WOODEN ENCLOSURE PANELS 2'X0.90CM AND 6MM BAMBOO



**LIBRARY**



**KITCHEN**

# PELLIS

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**Abd Al Qader Al Jaafari**

United Arab Emirates

**IAAC Special Mention**

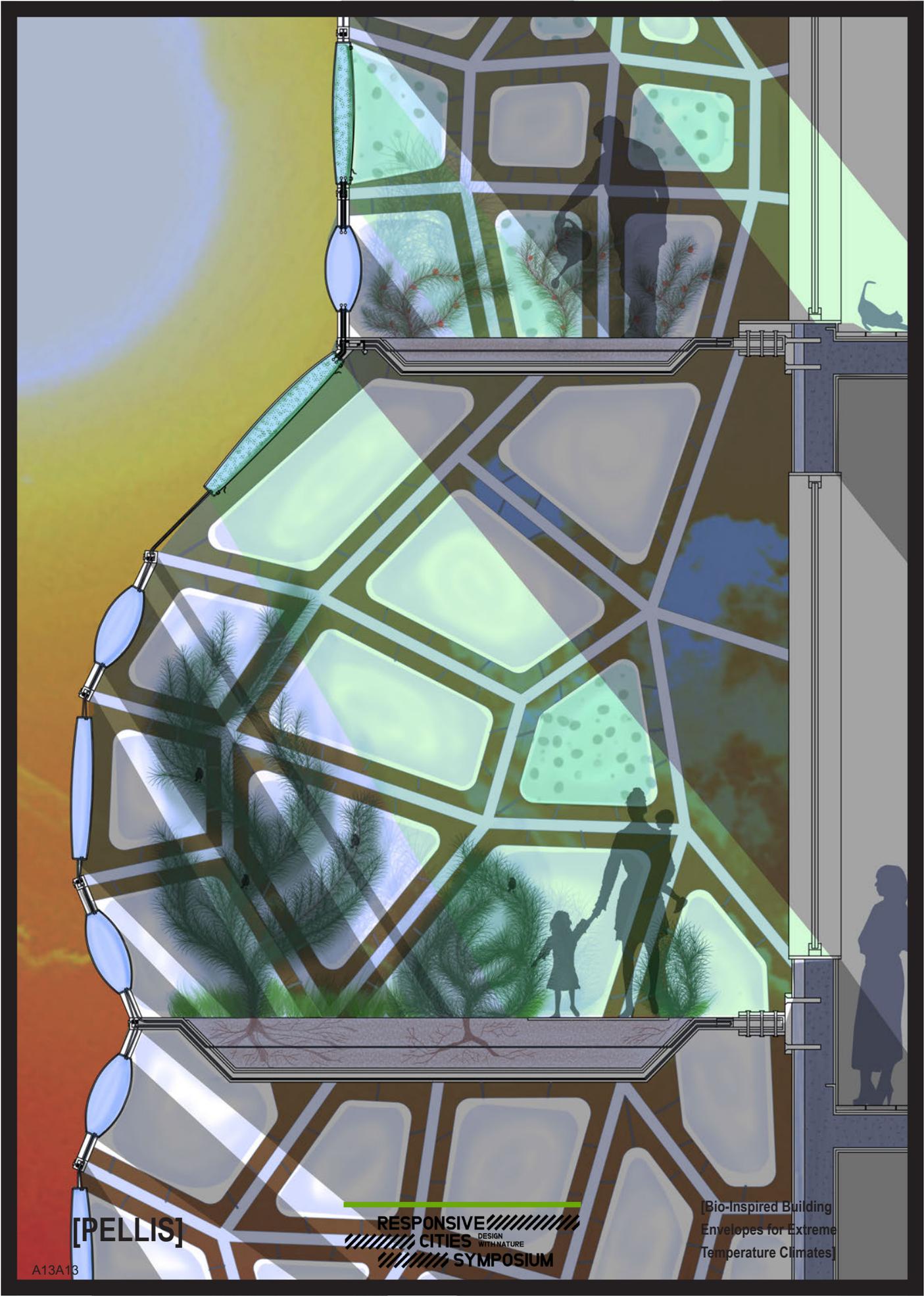
**KEYWORDS:** Responsive Facade, Algae Based BioFuel Cells, Self Sufficient System, BioPhilic Envelopes, Sustainable Architecture

**ABSTRACT:**

PELLIS is a conceptual study focused on the benefits of implementing a secondary building envelope to high rise buildings in extremely high temperature environments as a replacement to typical renovation practices. The aim of the added envelope is to provide two distinct functions; the first is to provide exterior accessible platforms that can be farmed and used by the public as gathering spaces; The second is to provide control over the harsh environmental characteristics of the environment applied on the architectural space by affecting the direct radiation input, the localized temperature, and the local humidity. The system also incorporates algae-based biofuel cells that passively generates an electrical output that self-sustains the motorized parts of the envelope reducing the projected carbon footprint of the added envelope.

The topology of the design is inspired by the local fauna's circulatory system as it aims to create a closed circulatory system of water that is cooled underground and then pumped throughout the system. The system then uses the cooled water on its surface within enclosed translucent ETFE pockets to reduce the local temperature via heat exchange. The ETFE pockets are also change size based on the sun radiation input applied to minimize the direct sun exposure on the façade. Specific pockets are also selected to function as biofuel cells generating the systems requirement of electricity from the photosynthetic properties of algae species enclosed within.

The system was simulated on a building facade in the UAE and produced an estimated ~50% reduction in temperature, ~40% reduction in humidity and a sufficient production of electricity to sustain the function.



[PELLIS]

RESPONSIVE  
DESIGN  
CITIES WITH NATURE  
SYMPOSIUM

[Bio-Inspired Building  
Envelopes for Extreme  
Temperature Climates]

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[CONCEPT & ABSTRACT]

THE OBJECTIVE OF THIS FACADE STUDY IS TO PROVIDE A BIO-INSPIRED FACADE SYSTEM THAT WILL BE INCORPORATED ONTO OLDER FACADES OF ANY BUILDING THAT RESIDES WITHIN THE DESERT BIOME. THE SYSTEM WOULD SERVE AS A SHADING DEVICE AND CLIMATE CONTROL WHILE PROVIDING A PUBLICLY ACCESSED GREENARY PLATFORMS THAT SERVE TO LOWER THE IMMEDIATE HUMIDITY AND PROVIDE AN AESTHETIC UPGRADE TO THE MONOTONE DESIGN LANGUAGE OF A TYPICAL METROPOLITAN. THE ADDITION OF THE GREEN ELEMENT ALSO IS INTENDED AS A METHOD TO HIGHTEN THE HUMAN INTERACTION WITH THE MONOTONE TYPICAL FACADE SYSTEM AS THE GREEN PLATFORM PROVIDED WOULD INCORPORATE FARMABLE ZONES WHERE HABITANTS CAN INVOLVE THEMSELVES WITH THE NEW FACADE SYSTEM AND THE EFFECTS IT PROVIDES FOR THE BUILDING.

THE DESIGN INTENT WAS CONSIDERED FOR THE TYPICAL METROPOLITAN OF DUBAI, UNITED ARAB EMIRATES AS THE HIGHER TEMPERATURE AND HARSHER CLIMATE PROVIDED A CHALLENGING ADAPTATION POSSIBILITIES, WHILE THE TYPICAL DUBAI URBAN FABRIC AND DESIGN LANGUAGE DOES NOT TYPICALLY ALLOW FOR ANY HUMAN INTERACTION WITH THE BUILT ENVIRONMENT. FURTHER TO THAT, THE CITY HAS GONE THROUGH A MASSIVE EXPANSION CYCLE ON AN URBAN SCALE, WHILE THE OLDER PARTS OF THE CITY THAT WAS BUILT WITHIN THE PAST 50 YEARS ARE PRIME FOR RENNOVATION WORKS, THUS ALLOWING US AN ENTRY POINT TO EASILY INTEGRATE THE SYSTEM INTO THE URBAN FABRIC RATHER THAN FORCEFULLY INTRODUCE IT.

AS FOR THE SYSTEM ITSELF, IT WILL BE A MODULAR INFLATED AND MESH REINFORCED ETFE SYSTEM THAT IS RESPONSIVE TO THE SUN RADIANCE, DIRECT RADIANCE AND TEMPERATURE INPUT AND THE IMMEDIATE HUMIDITY. THE SYSTEM WILL INCORPORATE A FUNCTIONAL BIO-FUEL CELL UNITS THAT UTILIZES THE HIGH SUN EXPOSURE TO GENERATE ELECTRICITY AND BIO-MASS. THE BIO-MASS GENERATE CAN BE THEN FURTHER UTILIZED AS FERTILIZER FOR THE FARMABLE GREEN PLATFORMS OR AS CONSUMABLE FOOD SOURCE FOR THE HABITANTS OF THE BUILDING SUBJECT TO THE SELCTION OF THE ACTIVE ALGAE SPECIES WITHIN THE FUEL CELL.

THE SYSTEM IN ESSENCE FUNCTIONS ON THE BASICS OF FLUID (WATER) CIRCULATION TO COOL THE FACADE SYSTEM. THIS IDEOLOGY OF DESIGN WAS INSPIRED BY STUDYING THE BIOMES FLORA THAT HAVE ADAPTED TO THE HARSH CLIMATE. AN EXTENSIVE STUDY OF THE FLORA REVEALED A TENDENCY OF THE FLORA TO HAVE LARGE SPREAD NARROW ROOT SYSTEMS THAT EXTEND AROUND THE PLANT BODY. THIS SYSTEM ASSISTS MAINLY IN STRUCTURAL SUPPORT OF THE PLANT AND NUTRIENT GATHERING, ALONG SIDE THE MINIMAL FUNCTION OF DIFFUSING THE TEMPERATURE OF THE INTERNAL PLANT'S FLUIDS DUE TO THE HIGH EXCHANGE OF HEAT WITH THE RELATIVELY COOLER SOIL. THIS CONCEPT IS WHAT INSPIRED THE DESIGN INTENT FOR THE COOLING CIRCULATORY SYSTEM OF PELLIS.

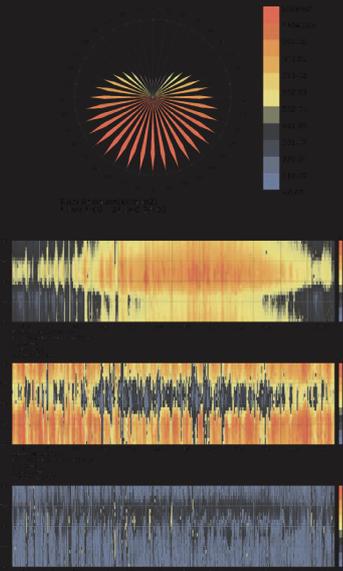


DIAGRAM -1 DUBAI CLIMATE STUDY.

THE CLIMATE STUDY ALLOWS US TO UNDERSTAND THE CHALLENGE POSED BY THE TEMPERATURE. WE NOTICE A HIGH EXPOSURE OF HEAT AND RADIANCE ON THE SOUTHERN, SOUTHERN EAST, AND SOUTHERN WEST DIRECTIONS ON MOST OF THE YEAR'S DURATION PEAKING BETWEEN MARCH AND NOVEMBER. WE ALSO NOTICE CONSISTENT HIGH HUMIDITY YEARLONG THAT PEEKS AROUND THE SAME DURATION OF THE RADIANCE PEEKS.

[DESIGN IDEOLOGY DEVELOPMENT]

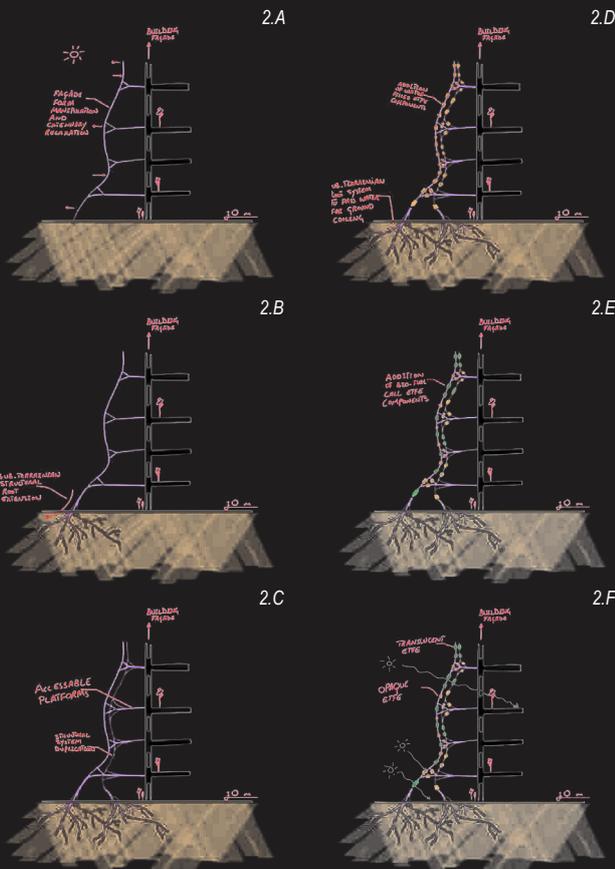


DIAGRAM -2 DESIGN IDEOLOGY DEVELOPMENT

THE SYSTEM WAS GENERATED BASED ON THE TYPICAL DETAIL OF EXTERNALLY ATTACHED FACADE SYSTEMS USUALLY USED WITHIN THE INDUSTRY OF DUBAI. THE TYPICAL RENNOVATED FACADE SYSTEM CONSISTS OF METALLIC STRUCTURES THAT FOLLOW THE FACADE TYPICAL FORM AND HOLDS THE CLADDING UNITS SELECTED.

(2.A) BASED ON THE TYPICAL FACADE SYSTEM, PELLIS SYSTEM IS OFFSETED AWAY FROM THE EXTERNAL STRUCTURAL FACADE OF THE BUILDING TO GENERATE A SEPERATION ACCESSIBLE VOID AND PLATFORMS. THE FORM ALSO WAS DEFORMED TO ALLOW FOR MAXIMUM INTERCEPTION OF SUN RADIATION.

(2.B - 2.C) THE SYSTEM'S ELEMENTS WERE INSPIRED BY THE NEEDLY SHAPES OF THE LOCAL FLORA, THUS THE ELEMENTS IN GENERAL ARE HOLLOWED STAINLESS-STEEL PIPING THAT SPREAD BELOW GROUND LEVEL INTO A ROOTING SYSTEM STABILIZING THE STRUCTURE AND ALLOWING FOR MAXIMUM HEAT EXCHANGE BETWEEN THE ENCLOSED WATER CIRCULATORY SYSTEM AND THE SURROUNDING SOIL.

(2.D) THE SYSTEM THEN WAS DUPLICATED TO ALLOW FOR MORE STRUCTURAL STABILITY.

(2.E) THE ETFE POCKET SYSTEM WAS THEN SPREAD ALONG THE STRUCTURAL ELEMENTS. THE ETFE SELECTED WOULD ALL BE MESH REINFORCED ETFE TO ALLOW FOR MORE STRUCTURAL INTEGRITY OF THE SYSTEM WHEN THE POCKETS ARE HOLDING LIQUID WATER. THE ETFE POCKETS ARE ALSO CONNECTED TO A PULLY SYSTEM EACH TO CONTROL THE SIZE OF THE POCKET THUS ALLOWING FOR RADIATION PENETRATION CONTROL INTO THE INTERMEDIATE VOID.

(2.F) THE POCKETS ARE ALSO SPLIT INTO TWO DISTINCT SYSTEMS, AND OPAQUE POCKET SYSTEM THAT WILL BE SPREAD ON THE HIGH RADIATION ZONES OF THE FACADE. AND A TRANSPARENT SYSTEM THAT WOULD BE SPREAD ON THE MEDIUM TO LOW RADIATION AREAS OF THE FACADE AS PER THE RADIATION STUDY PERFORMED. THE SYSTEM WOULD FUNCTION IN GENERAL AROUND THE BASIC HEAT EXCHANGE CONCEPT BETWEEN THE SOIL COOLED WATER THAT IS CIRCULATED WITHIN THE OPAQUE ETFE POCKETS, AND THE SURROUNDING AIR. FURTHER TO THAT, THE TRANSPARENT ETFE POCKET SYSTEM WOULD HOUSE THE ALGAE SPECIES ALLOWING FOR MORE RADIATION PENETRATION INTO THE INTERMEDIATE VOID AND ALLOWING THE SUN TO ACTIVATE THE ALGAE ENCLOSED TO PHOTOSYNTHESISE AND GENERATE ELECTRICITY WHILE GROWING.

[PELLIS]

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RESPONSIVE CITIES SYMPOSIUM  
DESIGN WITH NATURE

[Bio-Inspired Building Envelopes for Extreme Temperature Climates]

[SYSTEM DETAILING]

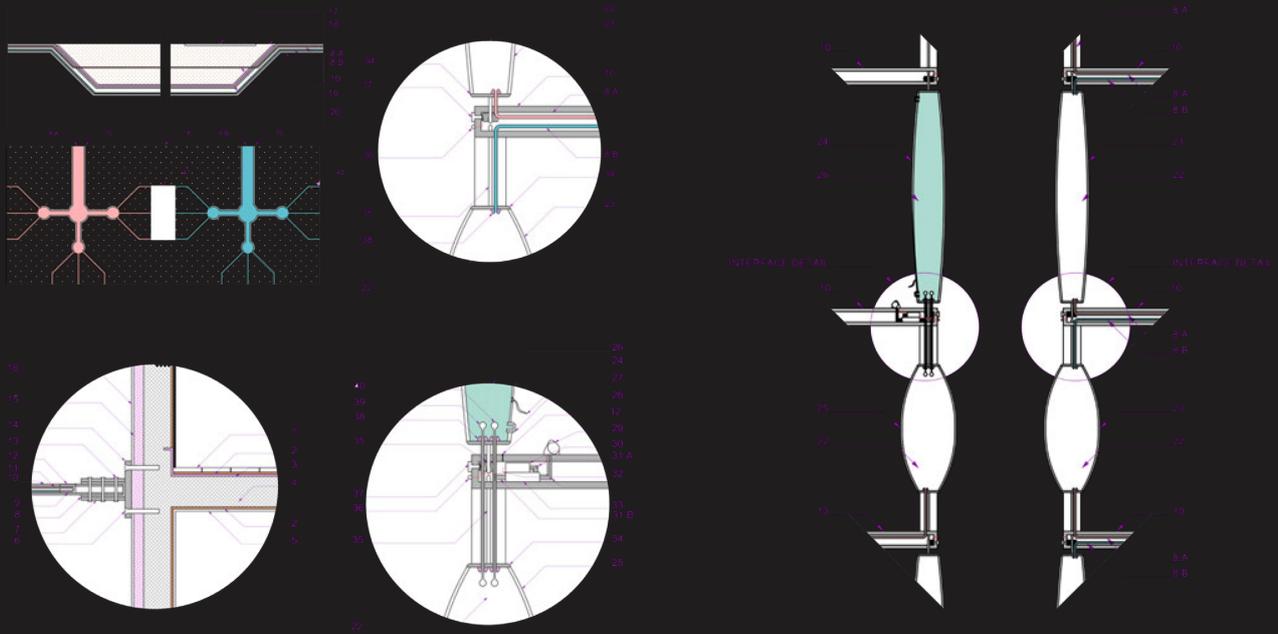


DIAGRAM 3 - SYSTEM DETAILS

1- Interior floor finish 2- Interior floor and wall mortar 3- Interior floor water proofing 4- Building structural Envelope 5- Interior wall finish 6- Chemical fixing anchor 7- PELLIS structural interface wall bracket glossy white stainless-steel finish 8- Flexible and stretchable water pipe dia 20mm (A- water output pipe feeding the system, Bwater input pipe feeding the system) 9- PELLIS circulation secondary water pump 10- PELLIS horizontal structural element ~150x150 mm cross section, 25mm thickness white stainless steel 11- Neoprene seating block and filler 12- Water pump compartment and hinged opening 13- Mechanical fixing nut and bolt 14- PELLIS structural interface with wall – base plate ~150x150x25mm stainless steel glossy white 15- Exterior façade thermal insulation ~30-45mm 16- Exterior façade renovated finish glossy white 17- PELLIS platform's walkable stone path, white sandstone. 18- PELLIS platform's soil and planter 19- Water intake pipe penetration into the platform's soil to assist in cooling 20- Planter water proofing 2x layers of 2mm bitumen membrane. 21- Reinforced ETFE membrane with embedded metallic mesh-opaque, white-relaxed state 22- Refined water enclosed system 23- Reinforced ETFE membrane with embedded metallic mesh-opaque, white-stressed state 24- Reinforced ETFE membrane with embedded metallic mesh-transparent- relaxed state 25- Reinforced ETFE membrane with embedded metallic mesh-transparent- stressed state 26- Algae medium 27- Sealed and waterproof sipping system embedded within the ETFE membrane to allow access for unit maintenance and cathode / anode replacement. 28- Corked drainage points top and bottom of the ETFE pocket to allow for media replenishment and cleaning. 29- Light fixture 30- Responsive system computer terminal 31- Electric cable (A-computer / battery, Bbiofuel cell cathode / anode) 32- Data cable 33- Battery and system fuse box 34- ETFE pocket rigid interface base with the motorized pully system 35- Pully system cabling ~10mm dia threaded elastic rope 36- Radiation intensity sensor 37- Pully system rotation motor and rope spool 38- Waterproof and leakage proof ETFE penetration interface 39- Cathode, metallic in nature (copper) 40- Anode, metallic in nature (Aluminum) 41- Below ground level main pump substation 42- Copper capillary piping

[CASE STUDY]



DIAGRAM 4- ORIGINAL STATE

DIAGRAM 5- SYSTEM APPLICATION

DIAGRAM 5- RESULT

THE PELLIS SYSTEM WAS APPLIED ON THE FACADE OF A NATIVE DUBAI BUILDING (THE PALLADIUM TOWER) AND SYMULATED TO A SUCCESS. THE ORIGINAL STATE OF THE FACADE HAD A DIRECT RADIATION UPWARDS OF 1100 KWH/M2 WITH A 2700+ HOURS OF ANNUAL DIRECT SUNLIGHT HOURS FOCUSED ON THE SOUTHERN, SOUTHERN WEST, AND SOUTHERN EAST FACADES. THE APPLICATION MANAGED TO PROVIDE A ~65% DIRECT RADIATION IMPACT ON THE INTERIOR BUILDING ENVELOPE. FURTHER TO THAT, THE DIGITAL SIMULATION PROVIDED A ~35% DECREASE IN HUMIDITY. THEY SYSTEM FUEL CELL ARRAY ESTIMATED AN AVERAGE OUTPUT OF 1 KILO VOLT IN PEEK HOURS OF THE DAY THAT WOULD BE USED AND SAVED BY THE BATTERY ARRAY ACCOMPANYING THE SYSTEM ITSELF.

[PELLIS]

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RESPONSIVE  
DESIGN  
CITIES WITH NATURE  
SYMPOSIUM

[Bio-Inspired Building  
Envelopes for Extreme  
Temperature Climates]

# REWILDING THE URBAN FABRIC

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**Kelly A. Curl, Associate Professor of Landscape Architecture**

Colorado State University  
United States

**IAAC Special Mention**

KEYWORDS: Rewilding, Urban Green Infrastructure, Ecosystem Services, Health, Urban Farming

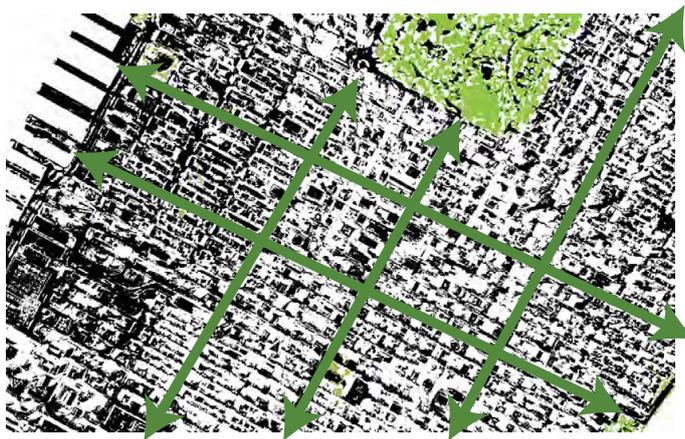
## ABSTRACT:

Built urban environments minimally retain natural ecosystem origins. Nature can be found in the city parks, trail systems, riparian zones, public gardens, and streetscapes. However, the wildlife and ecological corridors have been broken and removed for city growth, resulting in a patched mosaic urban landscape. Utilizing Nature-Based Solutions (NBS) as an urban design and planning tool allows recultivation of the urban landscape at a large scale. Rewilding our cities with native vegetation will increase biodiversity, improve air and water quality, reduce flood risk, while strengthening and rebuilding our urban ecologies. The economic, social, and environmental benefits are described through sharing the uncultivated, unmanicured, wild landscapes that attract the pollinators, birds, and wildlife back into the city. NBS results in positive landscape performance measures by cooling cities, absorbing pollutants, and recharging groundwater. The COVID-19 pandemic has imminently redefined our city streets for human health, access to nature, and urban farming. Urban agriculture improves food security for those in financial need. Having access to a variety of nutritious foods enhances the nutritional balance of the neighboring communities. The produce could also be an economic driver where those in lower income communities could profit by selling the produce. There are ecological and human benefits of replacing traffic and vehicles with native urban landscapes. Changing policy, to set the stage for nature to reemerge, will reap local, regional, and global benefits for the health of our natural world and human nature.

# rewilding the urban fabric



Barcelona



New York City



San Francisco

Built urban environments minimally retain natural ecosystem origins. Nature can be found in the city parks, trail systems, riparian zones, public gardens, and streetscapes. However, the wildlife and ecological corridors have been broken and removed for city growth, resulting in a patched mosaic urban landscape. Rewilding our cities with native vegetation will increase biodiversity, improve air quality, reduce flood risk, improve water quality, in addition to strengthening and rebuilding our urban ecologies. The economic, social, and environmental benefits are seen through sharing the uncultivated, unmanicured, wild landscapes that attract the pollinators, birds, and wildlife back into the city. Nature-based solutions (NBS) result in positive landscape performance measures by cooling cities, absorbing pollutants, and recharging groundwater. The COVID-19 pandemic has imminently redefined our city streets for human health, access to nature, and urban farming. There are ecological and human benefits of removing traffic, vehicles on the street, with rewilding and replanting streets. Changing policy to definitively set the stage for nature to reemerge will display local, regional, and global benefits to the health of our natural world and human nature.



Stormwater Basin in Sheffield's Grey to green project, Nigel Dunnett



Beech Gardens and The High Walk, Barbican Estate, Nigel Dunnett

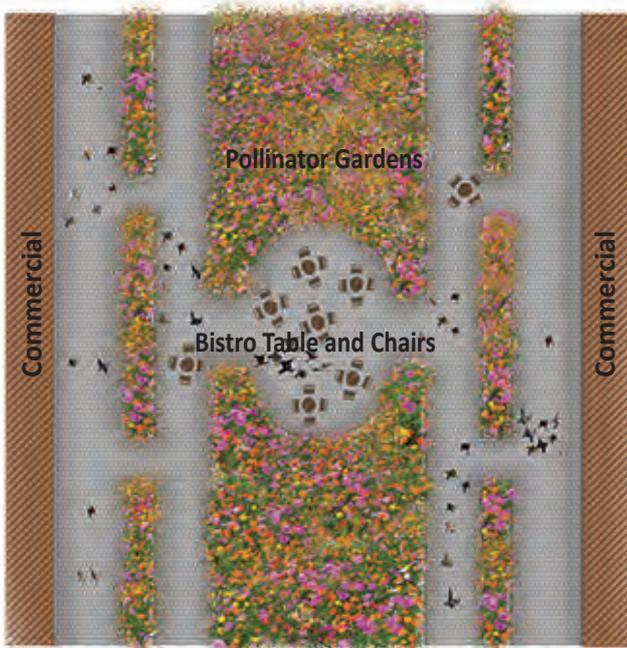


Piazza Vecchia as Green Square, Piet Oudolf in 2018

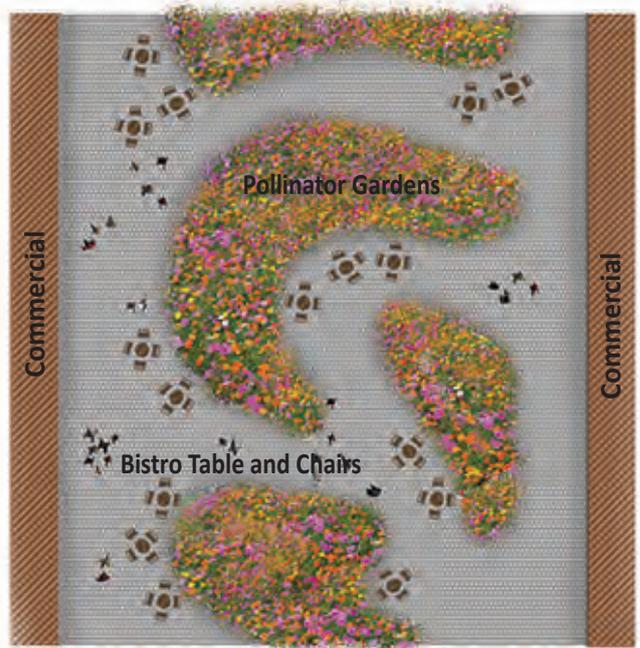
**RESPONSIVE**   
 **CITIES** DESIGN WITH NATURE  
 **SYMPOSIUM**

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# seeding the pollinator garden



Plan of Urban Street: Concept 1



Plan of Urban Street: Concept 2

RESPONSIVE  
DESIGN  
CITIES WITH NATURE  
SYMPOSIUM

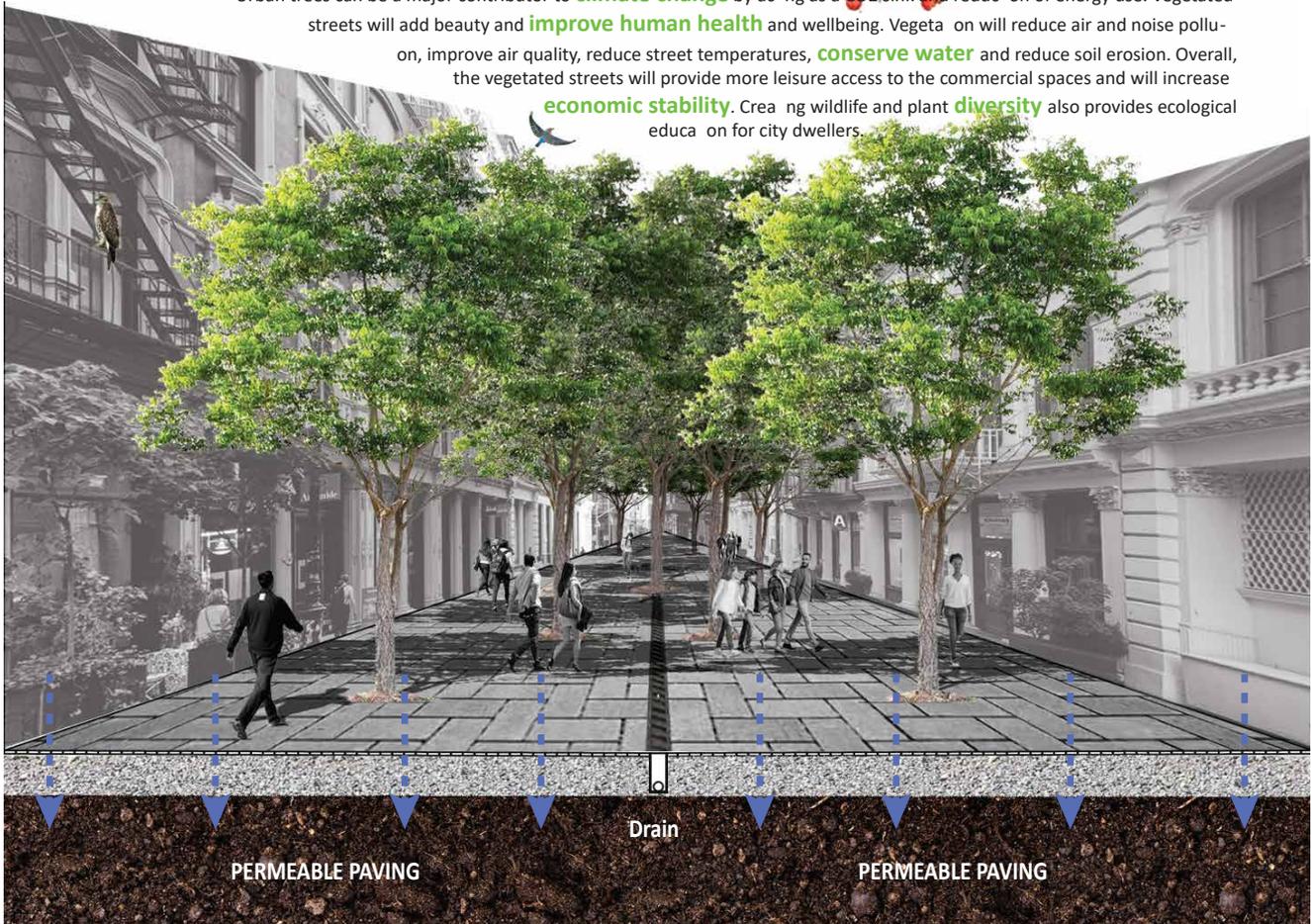
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### Food Security: Farm the Streets

Urban agriculture improves food security for those in financial need. Having access to a variety of nutritious foods enhances the nutritional balance of the neighboring communities. The produce could also be an economic driver, where those in lower income communities could profit by selling the produce.



Urban trees can be a major contributor to **climate change** by acting as a CO<sub>2</sub> sink and reduction of energy use. Vegetated streets will add beauty and **improve human health** and wellbeing. Vegetation will reduce air and noise pollution, improve air quality, reduce street temperatures, **conserve water** and reduce soil erosion. Overall, the vegetated streets will provide more leisure access to the commercial spaces and will increase **economic stability**. Creating wildlife and plant **diversity** also provides ecological education for city dwellers.



**RESPONSIVE** DESIGN  
**CITIES WITH NATURE**  
**SYMPOSIUM**

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# TO DA LOO

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## **Zoe Roane-Hopkins & Benjamin Chronister**

Larix Underground

United States

### **IAAC Special Mention**

**KEYWORDS:** Humanure, Reuse, Public Health, Water Quality, Biomimicry

#### **ABSTRACT:**

The current way we manage human waste is unsustainable. Outdated and failing waste infrastructure in cities overflow into the built environment and leach into the natural world, causing disease, illness, water and environmental degradation, and draining financial and human resources. Our current waste infrastructure often diverts fresh, clean, potable water to flush away our waste. In the face of climate change, these issues will only worsen. But if we design with nature, our waste doesn't have to be so wasteful.

Utilizing biomimetic design, we can learn from nature, our ancestors, and indigenous populations around the globe to solve a crucial part of our waste problem. TO DA LOO is a portable, clean, hygienic, and user-friendly way to turn human waste into humanure: combining multiple waste streams into a productive asset, decreasing stress on our water systems, improving public health and hygiene awareness, providing easily accessible sanitation to those in need, and enhancing environmental and social relations.

TO DA LOO uses lessons learned from prairie dogs, fan palms, cicada wings, and the millennia-old practice of composting to create a clean and comfortable composting toilet that turns human waste into productive fertilizer cleanly and efficiently. TO DA LOO can fit seamlessly into the urban fabric and be placed near community gardens, farms, or at any public gathering to take waste from those places and turn them into a productive resource in as little as 8-12 months. Unlock the poo-tential of human waste with TO DA LOO!

# TO DA LOO

Turning Poop into Potential

TO DA LOO is the urban composting toilet that turns human waste into an environmental asset. Biomimetic design reduces the stress on our cities' sewer systems, water pollution, and increases access to public bathrooms.



TURN HUMAN WASTE STREAMS INTO NEW PRODUCTS



REDUCE WATER USAGE AND CONTAMINATION OF WATER WAYS



INCREASE PUBLIC ACCESS TO BATHROOMS

## The Problem with Our Waste

The current way we manage human waste is unsustainable. Outdated and failing waste infrastructure in cities overflow into streets and leach into drinking water, causing disease and gastrointestinal illnesses, and cost millions of dollars after nearly every rainstorm. Our current waste infrastructure often diverts fresh, clean, potable water to flush away our waste, draining aquifers and poisoning our rivers, lakes, and oceans. In the face of climate change, these issues will only worsen. But if we design with nature, **our waste doesn't have to be so wasteful.**

## Why Compost Human Waste?

Indigenous populations around the globe have been composting human waste for millennia. Chinese farmers used to apply the famous "night soil" on rice paddies after collecting human refuse from the cities. They understood that people have a direct relationship with the land, and fertility taken from the land must be given back.

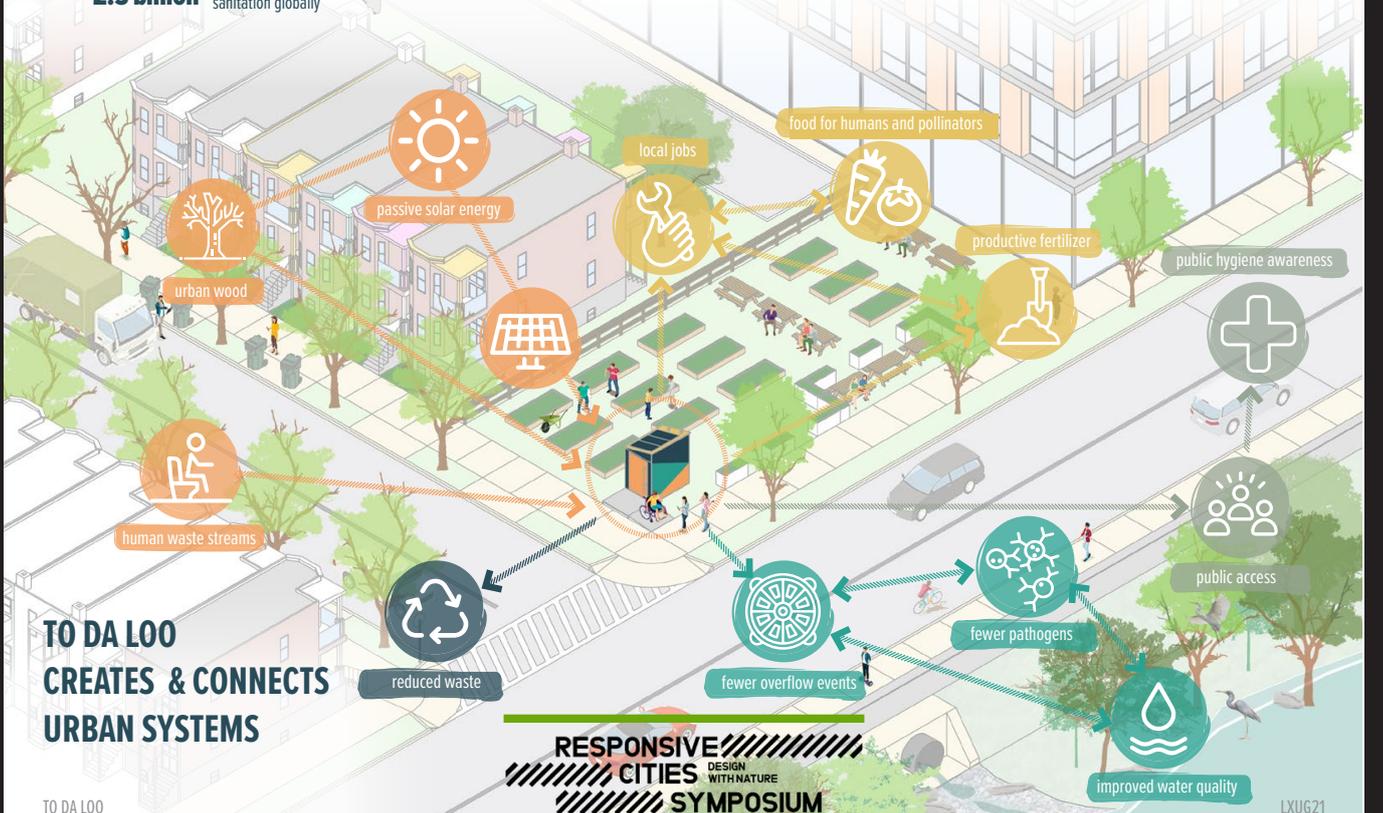
Well designed composting toilets can solve multiple problems at once:

- Combine multiple waste streams and turn them into a productive asset
- Decrease stress on our water systems
- Improve public health and awareness of hygiene
- Provide easily accessible sanitation to those in need
- Enhance social relations

**800+** U.S. cities with combined sewer systems (CSS)  
**23,000+** CSS overflow (CSO) events annually in the U.S.  
**27 billion** gallons of raw sewage released into New York harbor alone  
**5,000+** CSO-related illnesses annually in the U.S.  
**2.3 billion** people lack access to basic sanitation globally

## Meeting U.N. Sustainable Development Goals

- 3** Good health and well-being
- 6** Clean water and sanitation
- 9** Industry, innovation, and infrastructure
- 11** Sustainable cities and communities
- 12** Responsible consumption and production
- 13** Climate action
- 14** Life below water



**passive ventilation system**

Provides airflow to the solids storage tank to keep composting process aerobic. This reduces odors and hastens decomposition. A solar-powered fan may be activated when sensors detect low levels of oxygen in the tank to ensure constant air flow in all climates.

**perforated ventilation panel**

**bulking agent storage**

Bulking agents are added to the solids to absorb moisture and create air pockets to encourage the aerobic activity needed for the solids to properly convert to usable humanure. TO DA LOO uses recycled paper and wood chips from urban wood.

**weather-proof monitor center & solar inverter**

Sensors are used to detect when the bins are full. A thermometer also monitors the temperature, as certain temperature ranges are necessary to maximize decomposition. Inverter for solar panels is also located here.

**removable solid collection tank**

**removable liquid collection tank**

**informational signage**

Graphic on back of door that can be read while sitting on the toilet educates folks on the value of composting toilets in urban areas and how they work increases public awareness and understanding.

**toilet paper**

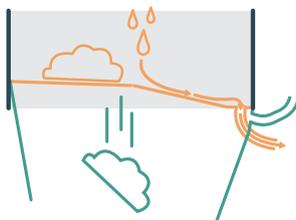
Made from recycled and compostable materials

**weight sensor with automatic locking system**

Locking door triggers toilet lid lifting to limit compost exposure

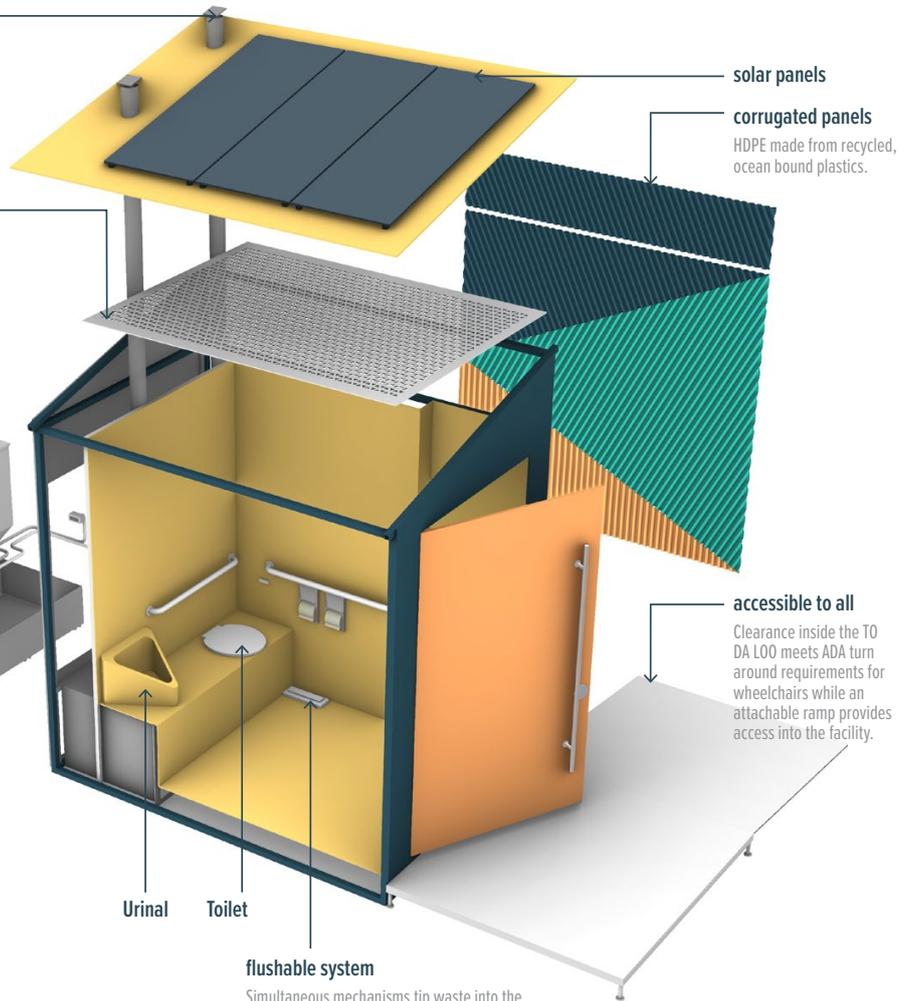
**human by-product separator**

For efficient composting and to allow resulting humanure to be more widely applicable, solids and liquids are diverted into separate containers.



1. Liquids flow down the slanted trap door (closed), toward a tube that directs liquid into a separate container. Solids rest on the closed trap doors.

2. When flush pedal is activated, traps open, dropping solids into collection tank below.



solar panels

corrugated panels  
HDPE made from recycled, ocean bound plastics.

accessible to all

Clearance inside the TO DA LOO meets ADA turn around requirements for wheelchairs while an attachable ramp provides access into the facility.

Urinal Toilet

**flushable system**

Simultaneous mechanisms tip waste into the appropriate bin and add bulking agent to the solids when activated by the floor or wall pedal.

**Back of House**

Houses all maintenance and electronics behind lockable panel doors. Solid and liquid collection tanks are in a separate compartment to confine any odors.



**WHERE DO YOU TO DA LOO?**





**Black-Tailed Prairie Dog  
Passive Ventilation & Aeration**

The asymmetrical turrets of the Black-Tailed Prairie Dogs create a pressure differential that directs air into the lower tube, causing directional airflow. Oxygen is key to the aerobic activity necessary for efficient and odorless decomposition. **TO DA LOO's** dual pipe ventilation system mimics the passive ventilation created by the Black-Tailed Prairie Dog's asymmetrical turret construction.



**Australian Fan Palm  
Cladding that Cools**

The corrugated cladding on the sides of the structure mimic the Australian Fan Palm, which directs air through the channels created by the corrugation, and blows off heat. **TO DA LOO's** cladding is high-density polyethylene made of recycled, ocean-bound plastic.



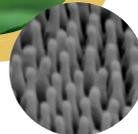
**Composting  
Turning Waste into Resource**

There is no such thing as waste in nature. **TO DA LOO** uses nature's model of handling excrement by passively turning it into compost, which can be used for many applications, including urban farming, and amending soil for landscapes.

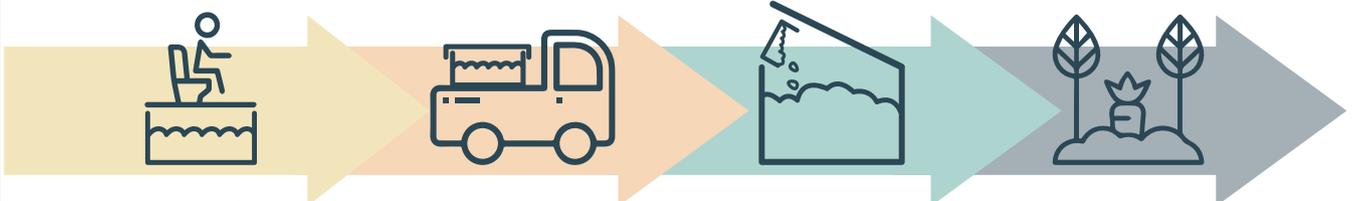


**Cicada Wings  
Anti-Bacterial / Superhydrophobic Surfaces**

Conical nano-structures on the wings of a cicada allow the passive destruction of bacteria that land on the wing surface. **On the toilet seat, the conical nano-structures create an antibacterial surface.** On the human by-product separator, the conical field creates a superhydrophobic surface that allows solids and liquids to easily slide into the appropriate basins.



**TO DA LOO's Compost Process**



**1. Making Waste**

The public uses **TO DA LOO**. Solids and liquids collect in their appropriate containers.

**2. Full Sensors**

When the bin fills, sensors within notify the responsible city or private department to pick up the bin and put an empty bin in it's place.

**3. Composting**

Full bins are taken to a yard waste facility where they are emptied into a dedicated composting area to fully compost into humanure. Urine can be used for fertilizer.

**4. Humanure**

In 8-12 months, humanure will be ready to use as a compost amendment for urban farms, gardens, and landscapes.

# RIBS OF CYPRESS

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**Lv Jingqing, Xiao Jiacheng & Zhai Meiheng**

Shenzhen University, South China University of  
Technology & Tianjin Chengjian University  
Bangladesh

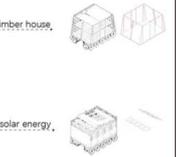
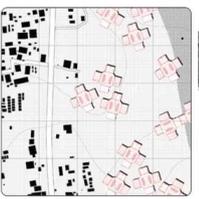
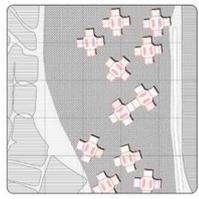
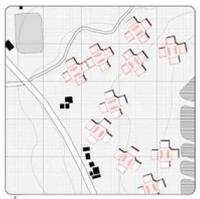
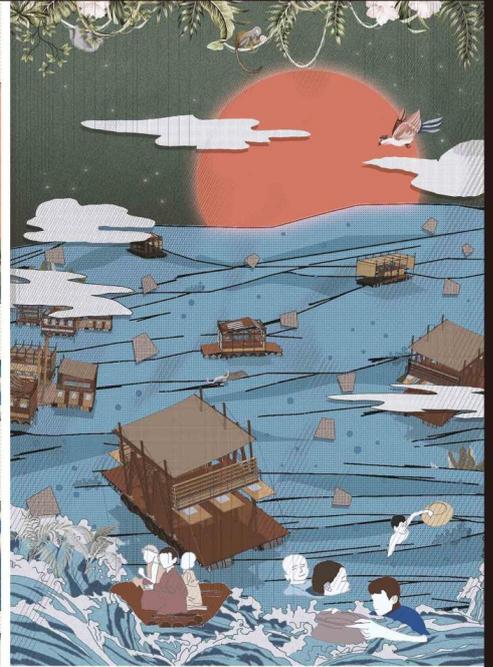
**IAAC Special Mention**

KEYWORDS: Ecological, Intelligent, In-site, Modular, Anti-Disaster

## ABSTRACT:

Although technology and science are developing rapidly, there are still many people who live difficultly under the threat of violence and natural disasters. That is the case in The Nayapara refugee camp in Bangladesh, where many Rohingya who fled Myanmar now live with limited resources. Refugees have nowhere to hide from natural disasters such as floods and rising sea levels. During the floods, Nayapa refugee camp was like an "open air prison," where undocumented Rohingya stayed. The hope is to build smart city models in a economic, positive and optimistic way to help them live a better life during and after natural disasters and provide them a platform at peace with local people. In order to achieve this goal, we adopted the idea of modularity, with functions such as education, medical care, storage, planting and event center, making the building more flexible and sustainable. The modular setting is in normal mode during normal times, but in the event of a disaster, it automatically switches to emergency mode, with some functions shifting to provide disaster relief, transportation and shelter. In terms of technology, salting-out technology to improve the ecological environment, heat-sensing technology to save mankind and early warning system to forecast disasters have been adopted. Our design mimics similar styles of local houses, trying to intervene in this area in a conciliatory way, as a catalyst, not only to heal their wounds and provide a new way of life, but also to broaden their horizons and even light up their lives.

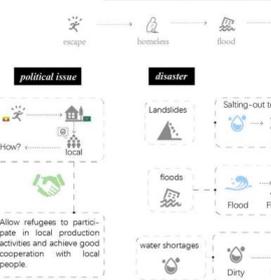




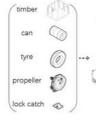
**outline**

The design starts from the technology and strategy, and then loads different forms of buildings according to the needs of the community. The strategy is a technical collaborative design of the whole system, matching with modules of different functions. In terms of technology, siting-out technology to improve the ecological environment, heat-sensing technology to save mankind and early warning system to forecast disaster have been adopted. This edition will detail how the various technologies work.

**The status of the Rohingya**



**Noah's Ark**

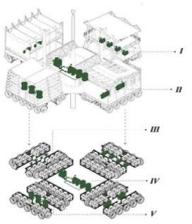


The needs for public space in refugee areas in Bangladesh can be divided into education, health, agriculture and community. The religious square is a gathering and prayer square as well as a transportation hub between various functional areas.



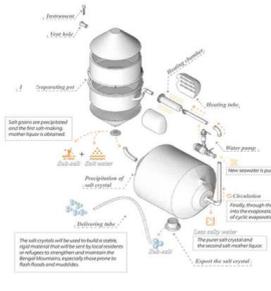
A complex community. Group of 10 units of communities. Conceptual community, an arranged shape needed to form a network, which are connected to form urban networks.

**Rainwater purification plant**

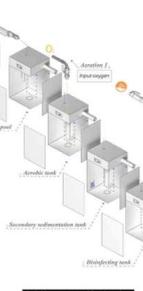


These technologies are located at the bottom of each functional area, between the levels. Different technical devices are installed according to the different needs of each functional area. They will be integrated into the design of the building. In order to ensure the water in a fully functional device at the bottom of the square, when the flood rises, the device will work with the ground surface.

**Siting-out device**

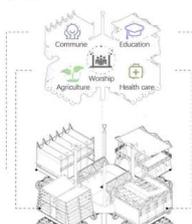


**Medical sewage purification plant**

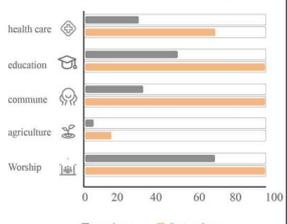


**The normal state**

When there is no flood, each functional area and square forms an independent composite community to meet the needs of local people and refugees.

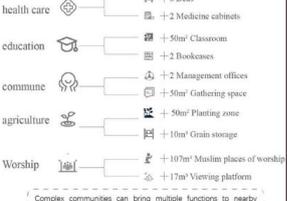


**Population analysis**



The five modules carry different numbers of people in different states. In ordinary daily state, they can carry 180 people, and in emergency state, the maximum capacity can reach 400 people.

**City level analysis**

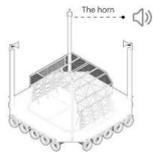


Complex communities can bring multiple functions to nearby residents and refugees. One or more complex communities can be placed where the city is needed. These complex communities distributed throughout the city can form a huge urban network.

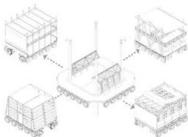
**RESPONSIVE DESIGN WITH NATURE CITIES SYMPOSIUM**



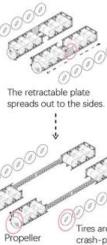
**Emergency mode**



In the middle of the square, an early warning device sounded the alarm before the flood, and a sunshade in the middle of the square deployed to act as a shelter from the rain.



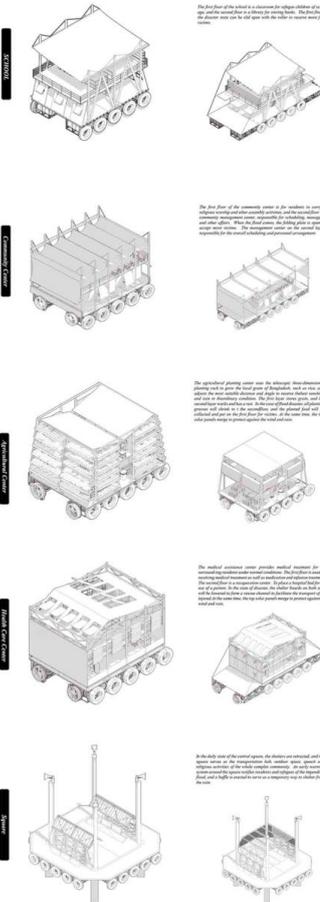
Before the flood, the warning device in the middle of the Worship sends out the alarm, and the surrounding functional areas choose whether to leave the square as needed.



The retractable plate spreads out to the sides.

Search and rescue using infrared sensor technology.

Use the navigation system to locate, search and return.



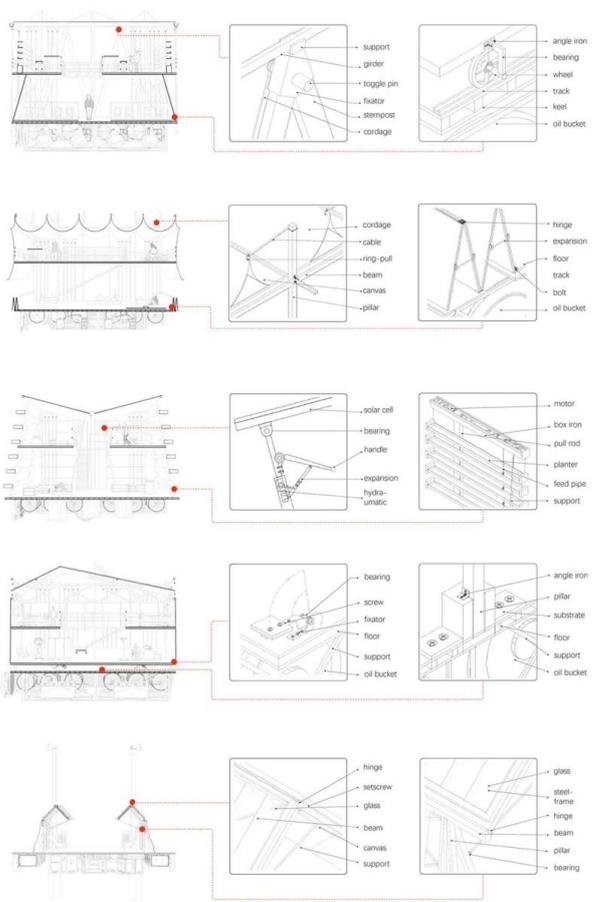
The first floor of the building is a common air storage shelter of great use and can be used to store things. The building is the main structure and can be used with the table to create a new floor.

The first floor of the common center is the common air storage shelter of great use and can be used to store things. The building is the main structure and can be used with the table to create a new floor.

The second floor of the common center is the common air storage shelter of great use and can be used to store things. The building is the main structure and can be used with the table to create a new floor.

The medical rescue center provides medical treatment for the common center. The building is the main structure and can be used with the table to create a new floor.

The table and the common center are the main structure and can be used with the table to create a new floor.



**RESPONSIVE DESIGN WITH NATURE**  
CITIES WITH NATURE SYMPOSIUM

## BOOK BOKK

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**Byron Esteban Cadena Campos, Sergio Daniel Calderón  
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Senegal

**IAAC Special Mention**

KEYWORDS: Women's House, Reintegrating Nature, User's Empowerment, Participatory Design, Collective Intelligence

ABSTRACT:

This project was inspired on Bagheri and the gender inequality, abuses, oppression, and low visibility women have every day. In this place, people live in a precarious situation and deal with a lot of social problems, this is why it is proposed a construction to be used as a tool for the members of the community to share solutions, participate in activities, protect all the members, but most important, where women who have directly identified inequalities can make everyone aware.

The distribution and form of the project arises from the abstraction of Senegalese housing typologies, which are based on dispersed settlements installed in the shape of a village. The houses are similar to huts and are organized around a tree or well taking into account the direction of the monsoon. The walls are built with vegetable fibers or cement blocks and the cone-shaped roofs are covered with thatch.

The project has three different layers and, above these spaces, three circular roofs are located on a central square where the ground, vegetation and water meet and take the center stage. The architecture considers the woman's relationship with soil and agricultural work through an approach that symbolizes an encounter with their roots and their rebirthing. This project is a simple intervention that articulates spaces and knowledge through collective actions, a tool that offers protection and integration to women and a place where everyone has the opportunity to express themselves, be present, be seen and heard.



## bOOK bOkk share & participate

The architectural proposal "bOkk bOOK" planned to the "Women's House" competition that will be implemented in Bagheri aims to be a material and symbolic contribution to the collective's dream of reducing gender inequality gaps in the community. The project is conceived as a tool that allows women to share, participate, protect and integrate members of the community, and where women who have directly identified inequalities can raise awareness among others.

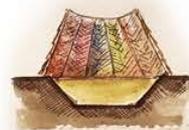
The architecture takes up the woman's relationship with soil and agricultural work through the approach of an architecture that is born below the natural level of the ground; it symbolizes the encounter with the roots and rebirthing from them.



KNOWLEDGE FROM WOMEN



TRADITIONAL CONSTRUCTION



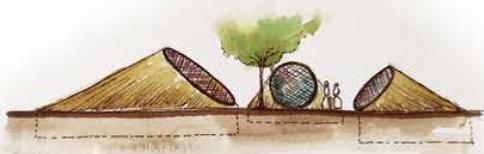
LEARNING BY DOING



WOMEN ENGAGEMENT



PROJECT IDEA



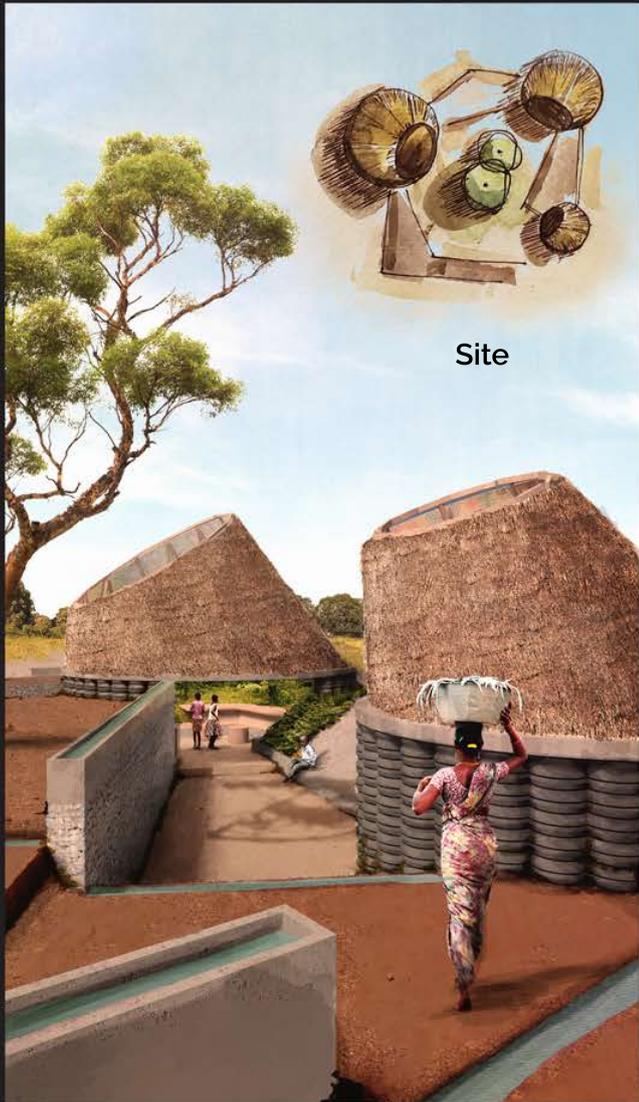
Facade



PROCESS OF CONSTRUCTION AS A RITUAL

RESPONSIVE  
DESIGN  
CITIES WITH NATURE  
SYMPOSIUM

XYZ789



Site



- 1 Dialogue 113 m2
- 2 Management 42m2
- 3 Dry Toilet + water 12m2
- 4 Square Collective Activities 125m2

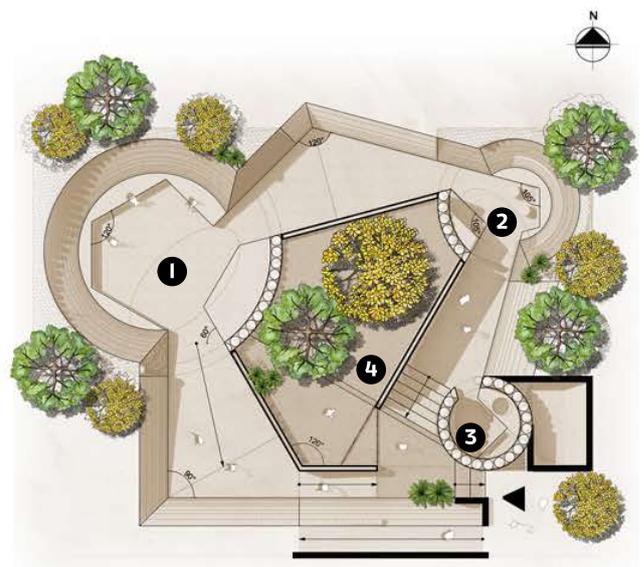


CIRCULAR TYPOLOGY



MATERIALS AND CONSTRUCTION TECHNIQUES

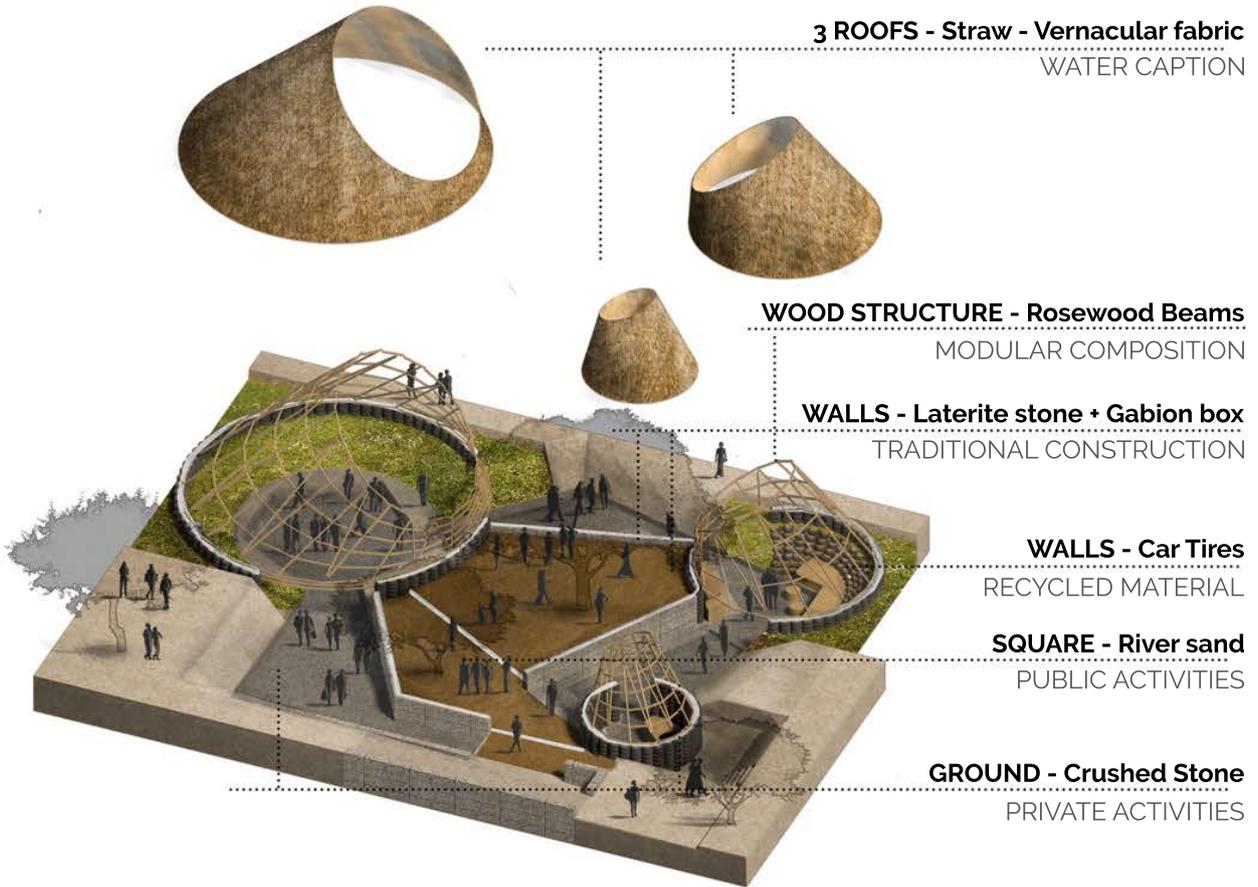
The distribution and form of the project arises from the abstraction of Senegalese housing typologies, which are based on dispersed settlements installed in the shape of a village. The spaces of these houses are organized around a tree or well (common space) which form a central square. These are made up of circular, square or pentagonal huts; the walls are built with vegetable fibers or cement blocks and the cone-shaped roofs are covered with thatch.



Underground level



**Construction model**



The project is built in different layers: it starts from the underground (protection) where 3 spaces with different levels of privacy are formed (personal hygiene, organization and dialogue) to a stage to display femininity, revalue women and admire the work made by their hands (collective activities).

**Longitudinal section**



## **BUILD Solutions Project Partners**

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