ARCHITECTURE AFTER FORCED MIGRATION

Architecture after forced migration

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Master of Architecture

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Communities affected by climate impacts, political or cultural conflicts and rapid demographic shifts are the most vulnerable to the effects of poverty, disease and communal violence. Addressing their needs through appropriate architectural responses can help them to recover social, economic and environmental well-being.

This thesis defines strategies to address the challenges involved in the design of spaces after three causes of forced migration: natural disaster, conflict and urban development. The methodology is based on literature review which served as theoretical background to work in three design competitions related to shelter after natural disasters, refugee camps and slums.

The need to provide accommodation after a natural disaster is essential. Therefore, a shelter that can be transported and deployed quickly and effectively, and that contemplates the uniqueness and complexity of the event, is studied in this thesis.

Refugee camps have become the protective and safe place that provide shelter, food and health safety to all kinds of survivors and refugees.

Due to the complexity of the problems related to this forced migration situation, the presence of refugee camps tends to be longer than the expected. Therefore, a design that contemplates this duality of time and that addresses peoples' needs and rights is part of this research.

Slums are often related to deprivation and socio-spatial exclusion and due to the lack of security of tenure, they are vulnerable to evictions caused by redevelopment pressures, gentrification processes and episodes of ethnic cleansing. Therefore, a neighborhood's transformation with cohesive public spaces and incremental housing prototypes is proposed in this thesis.

Through the study of architectural responses to natural disaster, refugee camps and slums design considerations related to the site, the culture and the urban context are established as guidelines. In addition, a time-based design strategy, a dual design approach and a multiple scales design strategy are defined as essential to give an architectural response to forced-displaced communities.

GENERAL AUDIENCE ABSTRACT

Devastating effects of natural disaster, political conflicts and demographic changes are experienced everyday worldwide. People who have faced them long for protection, safety and peace to have the strength to start again. Therefore, this thesis proposes some possible architectural solutions for situations where entire populations have lost their homes or have been displaced.

Temporary shelters provided after a natural disaster was the first theme studied. The research was complemented with the design of a shelter for a rural community in Ecuador which was devastated by the 2016 earthquake. Research and design demonstrated the need to design a structure aligned with the features of its context and that could be easily and quickly transported and deployed.

Thousands of people are forced to flee every day due to political and social conflicts. The second design that was part of this thesis was for Mosul, one of the cities that had been destroyed due to the conflicts in Iraq. The aim was to provide shelter for people that want to return to this city during its reconstruction. Through the design and research, it was defined that it is important to integrate the temporary camps in the reconstruction plan of the city to obtain a more appropriate approach towards the refugees' needs and values.

Neighborhoods wrongly categorized as slums are exposed to human displacement due to real state pressures, urban interventions and social reforms. The third and last project that was part of this thesis looked for a response to this problem in a neighborhood in Mumbai. Several projects were reviewed and diverse sources were consulted leading to the conclusion that public space should work in these neighborhoods as the meeting point of different groups of people and activities. In addition, it was established that affordable housing solutions should respond to economic situation of the dwellers and their future needs.

The importance of understanding the site, the culture and the context of every scenario was established essential to formulate an accurate solution for people that seek shelter after a natural disaster, armed conflict or eviction. In addition, considering different design scales and providing spaces with diverse uses and with the possibility to change through time was defined important to develop these projects.

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DEDICATION

To my parents, César y María Elena for their love and unconditional support and to my sisters, nieces and nephews for their care and affection.

ACKNOWLEDGEMENTS

INTRODUCTION

Communities worldwide struggle to adapt and maintain their environmental, economic and social well-being after being affected by climate impacts, political or cultural conflicts and rapid demographic shifts.

Natural disaster, conflict and development induced displacement are three causes of forced migration and the number of people affected by them are increasing abysmally every day. According to the Global Report on Internal Displacement of the Internal Displacement Monitoring Center, there were 31.1 million new internal displacements by conflict, violence and disasters in 2016. This is equivalent of one person forced to flee every second. Forced displaced populations are the most vulnerable to the effects of poverty, disease and violence; therefore, it is imperative to address their needs.

The aim of this thesis is to define strategies to address the challenges involve in the design of spaces after three causes of forced migration: natural disaster, conflict and urban development. The methodology applied to accomplish this goal was based in literature review which served as theoretical base to develop proposals for three design competitions whose topics were related to forced migration.

The reason to develop the design part of this thesis through competitions was based on the fact that they constitute an optimized interface for continuous research. Guilherme and Rocha (2013) claim that architectural competitions illustrate processes of change in society that are technical and organizational as well as social; as they show up constructive dilemmas and the borderline of rationality and the relative.

01

Theoretical background

1.1   SUSTAINABLE CITIES

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

On September 27th 2015, the General Assembly of the United Nations agreed on all the terms exposed for the 2030 Agenda for Sustainable Development. Its plan of action is focused on the people, the planet and their prosperity.

The Agenda describes 17 Sustainable Development Goals (Figure 01) and 169 targets which balance the three dimensions of sustainable development: the economic, social and environmental.

Even though all the goals and targets are integrated and indivisible, the proposed Sustainable Development Goal 11 "Sustainable cities and communities" is the most intimated related with the role of architecture in the pursuit of an inclusive and equitable global development. This goal has ten targets which are focused in the development of more inclusive, safe, resilient and sustainable cities by reducing pollution and poverty and improving access to basic services, energy, housing and transportation.

Dr. Aromar Revi, Director of the Indian Institute for Human Settlements claims that providing adequate housing encompass access to basic services, improved living conditions, security and education and job opportunities. This approach seeks a sustainable and equitable development.

CONCEPT OF SUSTAINABLE CITIES

The International Council for Local Environmental Initiatives (ICLEI) states that sustainable cities work towards an environmentally, socially, economically, healthy and resilient habitat for existing populations, without compromising the ability of future generations to experience the same.

Figure 01. 17 United Nations Sustainable Goals [1]

1.2   RESILIENCE

According to the Resilient Design Institute, resilience is the capacity to adapt to changing conditions and to maintain or regain functionality and vitality in the face of stress or disturbance. Through resilience individuals, households, communities and regions can maintain livable conditions in the event of natural disasters, displacement, or other interruptions in normally available services and living conditions.

Alexander (2013) defines resilience as the capacity of a society to bounce back after a disaster, the level of preparedness to confront or deal with it and the ability to recover quickly and successfully.

The UNISDR defines resilience as the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.

RESILIENT DESIGN PRINCIPLES:

* Resilience anticipates interruptions related to climate-related and and non-climate-related natural disasters and to anthropogenic actions.
* Strategies that increase durability enhance resilience. Durability involves building practices, building design, infrastructure and ecosystems.
* Resilience is not absolute, it should be achieve in stages.
* More diverse communities, ecosystems, economies, and social systems are better able to respond to interruptions or change, making them inherently more resilient.

* Simple, passive, and flexible systems are more resilient than complex solutions that can break down and require ongoing maintenance.
* By relying on and applying lessons from nature resilience can be enhanced.
* Locally available, renewable, or reclaimed resources are more resilient.
* Resilient systems should provide an equitable distribution of basic human needs. These include potable water, sanitation, energy, livable conditions (temperature and humidity), lighting, safe air, occupant health, and food.
* Strong, culturally diverse communities in which people know, respect, and care for each other contribute to resilience.
* Resilience strategies apply to different scales (buildings, communities, regions) and time parameters (immedite to long term).

By analyzing these principles, the relation between sustainability and resilience is evident. In fact, sustainable and resilient communities are defined as societies that are structurally organized to minimize the effects of disaster, and at the same time, have the ability to recover quickly by restoring the socioeconomic vitality of the community.

1.3   FORCED MIGRATION

The Japanese architect Shigeru Ban claims that an imminent consequence of humanitarian crises including forced displacement is the growing vulnerability of affected populations to the effects of poverty, disease, and communal violence. In his opinion, it is momentous to propose adequate architectural responses to address the challenges involve in the design of forced migration scenarios.

The International Association for the Study of Forced Migration (IASFM) defines forced migration to the movements of refugees and internally displaced people displaced by conflicts, natural or environmental disasters, chemical or nuclear disasters, famine, or development projects. The Global Report on Internal Displacement asserts that there were 31.1 million new internal displacements by conflict, violence and disasters in 2016. This is the equivalent of one person forced to flee every second.

The study of forced migration and its causes is diverse and complex. For methodological purposes the scope of this research will be related to the analysis of three causal factors of this phenomenon: natural disaster induced displacement, conflict-induced displacement, and development-induced displacement.

TYPES OF FORCED MIGRATION

- NATURAL DISASTER INDUCED DISPLACEMENT

People displaced as a result of natural disasters (floods, volcanoes, landslides, earthquakes), environmental change (deforestation, desertification, land degradation, global warming) and human-made disasters (industrial accidents, radioactivity) are included in this type. According to the Internal Displacement Monitoring Centre (IDMC) in 2016 there were 24.2 million new displacements by disasters in places characterized by high levels of socio-economic vulnerability. This condition of poverty and inequality is what makes a resilient reconstruction even more difficult.

The World Bank handbook for reconstructing after Natural Disasters recommends that every reconstruction should begin the day of the disaster with unique approaches related to: institutional strategy, financial strategy, community participation approach, reconstruction approach, and risk management. Particular conditions such as the handling of disaster debris, the need to plan land uses for housing and infrastructure, the cultural assets of the community and the features of reconstruction building process are additional aspects to be analyzed.

Secure shelter, rebuild infrastructure, recovery livelihoods and rebuild the sense of community and social capital are the main challenges to be addressed in natural disaster induced displaced scenarios. In addition, due to the time required to work on them one critical issue that the reconstruction policy must address in this type of migration is whether transitional shelter will be provided to affected households.

- CONFLICT INDUCED DISPLACEMENT

People who are forced to flee their homes due to armed conflict including civil war; generalized violence; and persecution on the grounds of nationality, race, religion, political opinion or social group and where the state authorities are unable or unwilling to protect them are included in the category of conflict induced displacement. Refugee, internally displace person, stateless person and asylum seeker are the categories of conflict induced displacement population.

A refugee is someone who has been forced to flee his or her country because of persecution, war, or violence. People forced to flee their homes but never cross an international border are known as Internally Displaced Persons or IDPs. A stateless person is someone who is not a citizen of nay country. People who flee their own country and seek sanctuary in another country are asylum seeker.

According to the United Nations Refugee Agency by 2016, 65.6 million people have been forcibly displaced worldwide, 40.3 million people are IDPs, 17.2 million are refugees under UNHCR mandate and 5.3 million are Palestinian refugees under the UNRWA mandate. The number of IDPs has nearly doubled since 2000 and has increased sharply over the last five years. For instance, in 2016, there were 6.9 million new internal displacements by conflict and violence. Sub-Saharan Africa overtook the Middle East as the region most affected, with almost one million new displacements in the Democratic Republic of Congo. In the Middle East significant levels of displacement continued with Syria, Iraq and Yemen experiencing close to two million new displacements in total during 2016.

Behind all these numbers there are countless stories of hardship, grief and loss. Families that were forced to flee their homes, communities and countries who struggle to rebuild their lives in host cities and countries. Camps created in a situation of emergency as a protective device intended to provide shelter, food and healthy safety become their home. These places agglomerate tens of thousands of inhabitants for periods that surpass the temporary condition. Social, cultural, economic and urban complexities emerge with the formation of these structures designed with temporary considerations in a permanent setting.

- DEVELOPMENT INDUCED DISPLACEMENT

People displaced as a result of policies and projects implemented to enhance urban renovations are considered development induced displacement population. Masses (2014) affirms that there is a significant gap between housing policy and housing needs, as those who are generally unable to afford housing alternatives are more susceptible to eviction as they tend to live in places like slums that lack of security of tenure.

UN-Habitat define slum household as the inhabitant who suffer one or more of the following 'household deprivations': lack of sufficient living area, lack of housing durability, lack of security of tenure, lack of access to improved water source and lack of access to improved sanitation facilities.

According to the 2016 Slum Almanac, 16500 people per day become slum residents and there are currently 0.88 billion urban residents leaving in slum conditions. Slums are often related to deprivation and socio-spatial exclusion, a condition that also affects the overall prosperity of the cities in which they exist.

Lack of security of tenure, a characteristic of slums, is a condition that threatens the stability of their dwellers and exposed them to development induced displacement or forced evictions. Goetz (2012) cites that forced evictions result from a number of different causes, all of which are attributable to either direct or indirect state action. These causes range from redevelopment pressures being felt in many urban areas to episodes of ethnic cleansing. He claims that forced evictions exacerbate the psychological, social, and material deprivations of people living in poverty, disrupting social networks, survival strategies, and access to medical care, food, water, and sanitation.

02

Temporary shelters

2.1   DISASTER

The Centre for Research on the Epidemiology of Disasters (CRED) defines a disaster as "a situation or event which overwhelms local capacity, necessitating a request to a national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction and human suffering".

A natural disaster occurs when a hazard impacts on vulnerable people. The combination of hazards, vulnerability and inability to reduce the potential negative consequences of risk results in disaster.

The International Federation of Red Cross (IFRC) defines vulnerability as "the diminished capacity of an individual or group to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard." The concept is relative and dynamic. Vulnerability is mosty associated with poverty, but it can also arise when people are isolated, insecure and defenseless in the face of risk, shock or stress.

Natural hazards are defined by the IFRC as "the naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical (earthquakes, landslides, tsunamis and volcanic activity), hydrological (avalanchesand floods), climatological (extreme temperatures, drought and wildfires), meteorological (cyclones and storms/wave surges) or biological (disease epidemics and insect/animal plagues)."

The International Disaster Database provided by the Catholic University of Leuven affirms that in 2015 98.6 million people were affected by natural disasters and around 23 thousand were killed by them. Diverse authors claimed that earthquakes and their secondary hazards claim the largest number of lives of all large natural disasters. For instance, in 2015, 9.5 thousand people were killed by earthquakes and their aftershocks. This is the equivalent to 40 percent of the people killed by all type of natural disasters in the same year.

Figure 02. Earthquake damage [2]

Figure 03. Storm damage [3]

2.2   POST DISASTER RECONSTRUCTION

Every disaster is unique in its complexity, impact, and cultural context. Therefore, a reconstruction approach based on the local, cultural, social, and economic life of the affected community should direct the reconstruction considerations. In addition, the assessment of the extent of damage, loss, and needs and an interdisciplinary participation of diverse actors such as policy makers, project managers, humanitarian agencies and the affected community is encouraged.

Safer Homes, Stronger Communities: A Handbook for Reconstructing after Disasters was developed by the World Bank to assist the diverse actors engaged in large-scale post-disaster reconstruction programs. The Handbook emphasizes that post-disaster reconstruction begins with a series of decisions that must be made almost immediately, but that will have long-term impacts, changing the lives of those affected by the disaster for years to come.

People affected by a disaster need to secure shelter and rebuild their livelihoods. Infrastructure such as roads, schools, and power generation is as fundamental to recovery and livelihoods as housing is. Also important is the rebuilding of the sense of community and of social capital. Hence, a good reconstruction strategy should engage communities to work together to rebuild their housing, their lives and their livelihoods. In fact, community members are the most critical partners in the reconstruction process. Initially, they will define their

needs to secure shelter and rebuild their livelihoods, then they should collaborate on housing designs and immediate infrastructure improvements, finally they will become the largest contributor of labor to the reconstruction effort.

People's expectations regarding the time frame for reconstruction are often overly optimistic; however, reconstruction and recovery will probably take a number of years. Transitional shelter can smooth the transition in this long term process from disaster to permanent housing. Its role is to provide incremental support from the moment recovery begins until the permanent shelter solution is ready. Transitional shelter is not a phase of reconstruction, but it is a philosophy that recognizes that reconstruction usually takes years to complete and that shelter is required throughout this period.

Mobility, autonomy and longer life span are some of the features of a transitional shelter. They are designed to be quickly disassembled and relocated. Its drawbacks are the initial cost and the logistical implications. However, while, the initial cost is higher compare to some traditional temporary solutions, such as tents, the operating costs may be significantly lower. Lack of basic infrastructure is an additional shortcoming of this shelter solution. Therefore, it is mandatory to complement it with self-sufficient interim services, such as water delivery and storage and latrines.

UNITED NATIONS GLOBAL SHELTER DESIGN

Suggested temperature range   Time for construction   Number of people required for construction   Life span

Figure 04_ UNCHR Family tent [4]

Figure 05_ UNCHR Family tent (elevation) [5]

40 C
5 C

30 minutes

3 persons

1 year

COST 420 US$

AREA 26.4 m2

Figure 06_ UNCHR Framed tent [6]

Figure 07_ UNCHR Framed tent (elevation) [7]

40 C
5 C

30 minutes

3 persons

1 year

COST 700 US$

AREA 16.6 m2

UNITED NATIONS GLOBAL SHELTER DESIGN

🌡 Suggested temperature range   ⏱ Time for construction   👥 Number of people required for construction   🕐 Life span

🌡 45 C
5 C

⏱ 30 minutes

👥 3 persons

🕐 1 year

COST 420 US$

AREA 18.5 m2

Figure 08_ UNHCR Self-standing family tent [8]
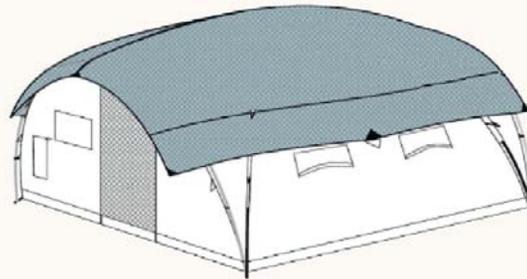
Figure 09_ UNHCR Self-standing family tent (axonometry) [9]

🌡 40 C
5 C

⏱ 5-6 hours

👥 4 persons

🕐 3 years

COST 1150 US$

AREA 17.5 m2

Figure 10_ Refugee Housing Unit [10]

Figure 11_ Refugee Housing Unit (elevation) [11]

UNITED NATIONS DURABLE SHELTER DESIGN

🌡 Suggested temperature range   ⏱ Time for construction   👤👤👤 Number of people required for construction   🕐 Life span

LOCATION Pakistan

🌡 50 C / -5 C

⏱ 5-7 days

👤👤👤 4 persons

🕐 10 years

COST 1949 US$
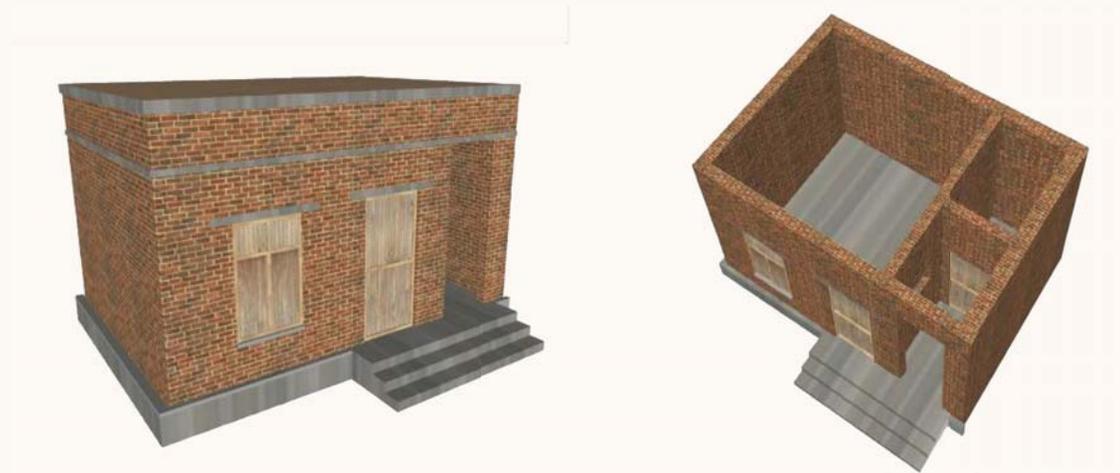
AREA 25 m2

Figure 12_ One room shelter [12]

LOCATION Iraq

🌡 50 C / -5 C

⏱ 3 weeks

👤👤👤 5 persons

🕐 10 years

COST 8217 US$
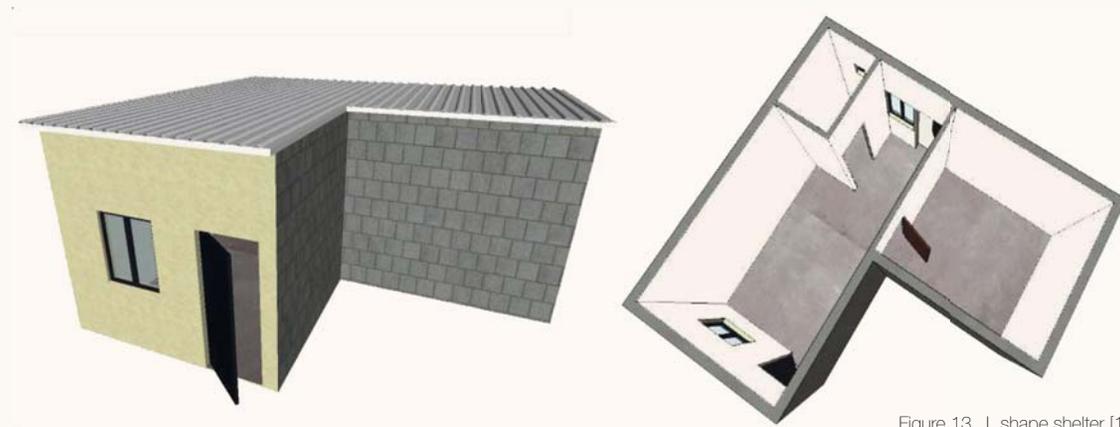
AREA 40 m2

Figure 13_ L shape shelter [13]

UNITED NATIONS EMERGENCY SHELTER DESIGN

🌡️ Suggested temperature range   ⏱️ Time for construction   👤👤👤 Number of people required for construction   🕐 Life span

LOCATION South Sudan

🌡️ 40 C / 5 C

⏱️ 2 days

👤👤👤 1 skilled + 2 labours

🕐 2 years

COST 299 US$

AREA 12 m2

Figure 14_ Wooden gable frame shelter [14]

LOCATION Burkina Faso

🌡️ 40 C / 10 C

⏱️ 1 day

👤👤👤 3 persons

🕐 2 years

COST 376 US$

AREA 21 m2
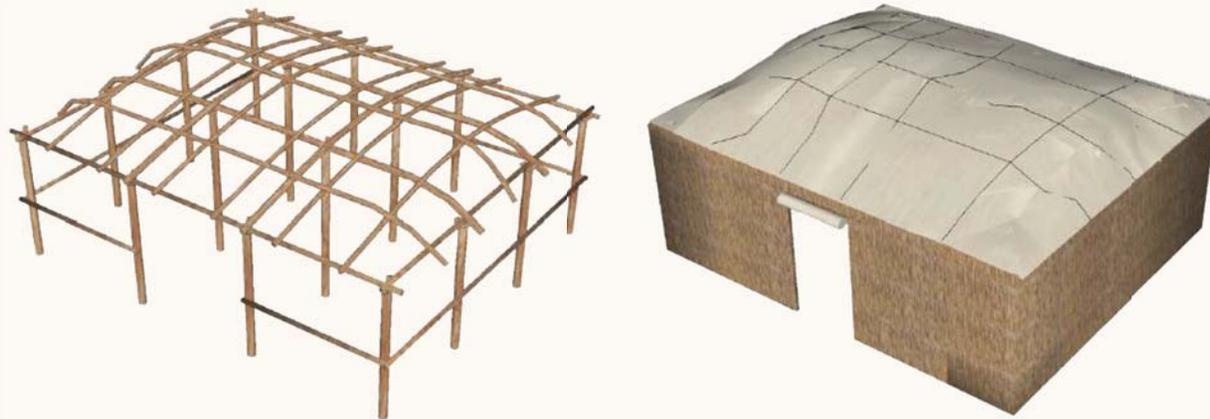
Figure 15_ Tuareg shelter [15]

Figure 16_ Tuareg tent [16]

LOCATION Algeria

40 C
10 C

1 day

3 persons

2 years

COST 1190 US$

AREA 49 m2

Figure 17_ Tukul shelter [17]

LOCATION South Sudan

45 C
5 C

1 day

3 persons

2 - 4 years

COST 250 US$

AREA 21.6 m2

Figure 18_ Tent shelter [18]

LOCATION Afghanistan

35 C
5 C

4 hours

1 skilled +
3 labours

2 years

COST 813 US$

AREA 38.7 m2

# UNITED NATIONS TRANSITIONAL SHELTER DESIGN

LOCATION Jordan

🌡 40 C

🌡 10 C

⏱ 12-16 hours

👤👤👤 4 persons

🕐 2-4 years
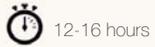
COST 342 US$

AREA 24 m2
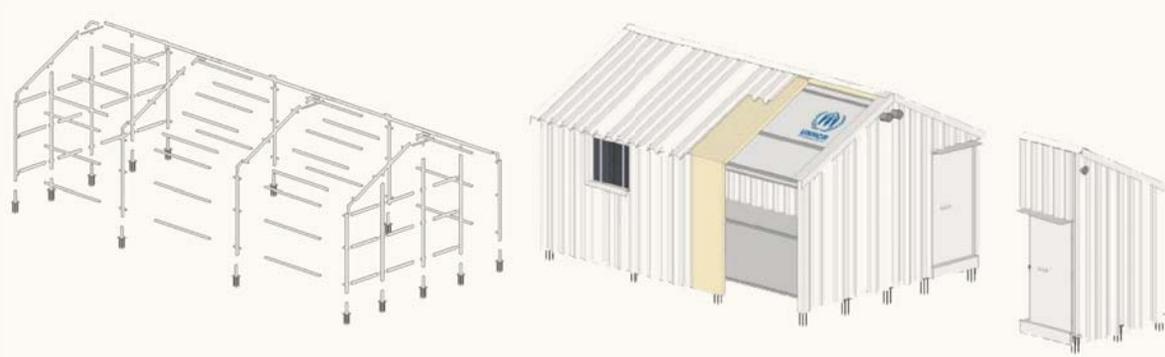
Figure 19_ Azraq T-shelter [19]

LOCATION Ethiopia

🌡 40 C

🌡 10 C

⏱ 1 day

👤👤👤 3 persons

🕐 2-4 years

COST 708 US$

AREA 21 m2

Figure 20_ Compact bamboo shelter [20]

LOCATION Myanmar

🌡 45 C

🌡 5 C

⏱ 2 days

👤👤👤 3 persons

🕐 2-4 years

COST 658 US$

AREA 36 m2

Figure 21_ Twin elevated shelter [21]

01

PAPER LOG HOUSE

Architect:
Shigeru Ban, Mamiko Ishida

Location:
Nagata, Kobe, Japan

Project Year:
1995

Figure 22. Paper Log House [22]

Figure 23. Paper Log House [23]

With this project, Ban identified a group that he felt needed special attention, who he fell through the cracks of government and worldwide humanitarian aid and he donated his own resources and raised funds for the projects.
The construction system is based on paper tubes, which are only four millimeters thick and ten centimeters wide, were coated in polyurethane and tied in to a foundation of sandbag-filled beer crates. Its assembly could be carried out by a team of student volunteers, who can build a house in six to ten hours.


Figure 24. Paper Log House [24]


Figure 25. Paper Log House [25]
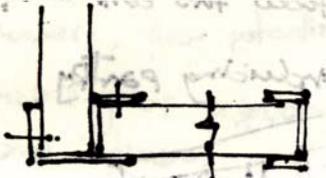
CORNER
DETAIL.
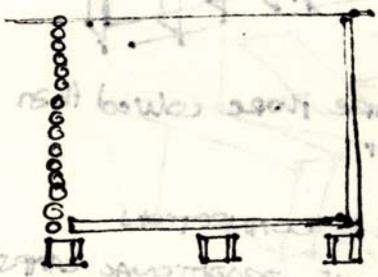
CRATES IN THE
extremes and in the
middle
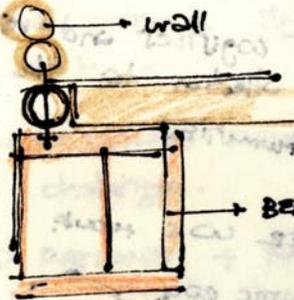
→ wall

→ floor

→ BEER CRATE
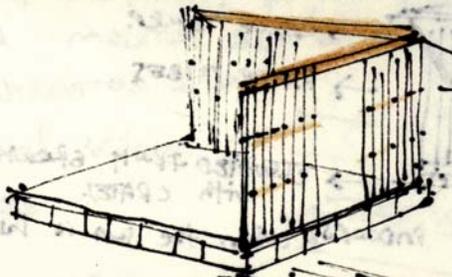
→ horizontal
reinforce
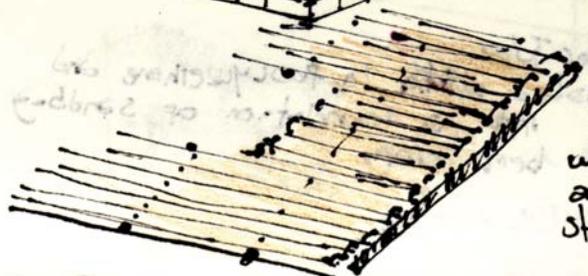
wall with
PAPER TUBES inside
with a plywood
and reinforced with
steel cable.
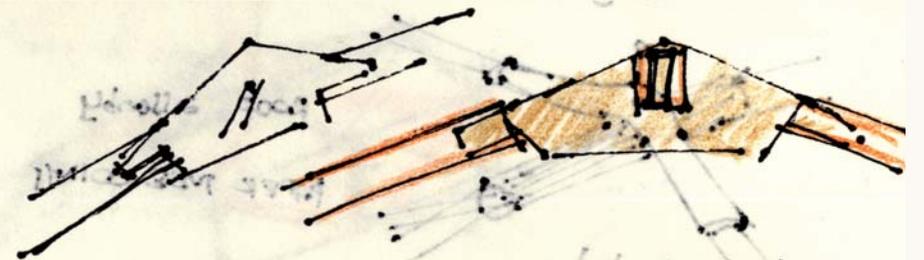
WOOD PIECES should be
designed to ensemble the roof
structure.
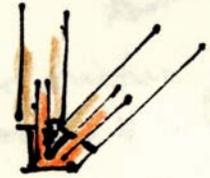
→ wood that
cover the floor

→ CRATES

PAPER TUBE CHURCH, a plywood column-base
connector was designed.
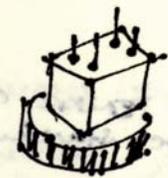
→ above it the paper tube will fit

Think for the roof a waterproof canvas
that can be displayed with tensor cable.
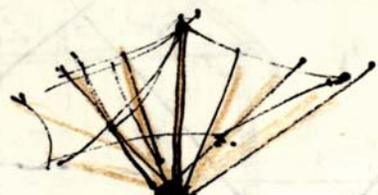
02

PAPER EMERGENCY SHELTER FOR HAITI

Architect:
Shigeru Ban Architects
Keio University
Voluntary Architects' Network
Students from Harvard University
UNIBE

Location:
Port-au-Prince, Haiti

Project Year:
2010

The shelters Ban erected near the village of Digner enabled people to camp at a site near the U.S. embassy. Using the paper-tube frame and tarp system Ban built temporary emergency shelters for refugees in Haiti. Cardboard panels and paper tubes supported plastic sheeting in spacious units. This version improved the plywood joints and ties to the ground.

Figure 26. Paper Emergency Shelter for Haiti [26]

Figure 27. Paper Emergency Shelter for Haiti [27]

Figure 28. Paper Emergency Shelter for Haiti [28]

Figure 29. Paper Emergency Shelter for Haiti [29]

03

PAPER LOG HOUSE

Architect:
Shigeru Ban
Yasunori Harano
Voluntary Architects' Network

Structural Engineer:
Minoru Tezuka

Location:
Daanbantayan, Cebu, Philippines

Project Year:
2014

Ban developed a paper-log house, a variant of the houses he had erected in Japan, Turkey and India. He incorporated elements of his Paper Partition System to erect the walls as large units. For the foundations, he used sandbag-filled Coca-Cola crates, covered with floor panels of plywood and coconut. The walls are prefabricated bamboo mats, and the roofs are plastic sheeting and thatched palms.

Figure 30. Paper Log House for the Phillippines [30]

Figure 31. Paper Log House for the Phillippines [31]

Figure 32. Paper Log House for the Phillippines [32]

Figure 33. Paper Log House for the Phillippines [33]

MIAO MIAO NURSERY SCHOOL.
JOINT FOR BEAMS + COLUMN.

· PAPER LOG HOUSE, PHILIPINES.

→ PLASTIC SHEET + PIPE w/ DRIP.
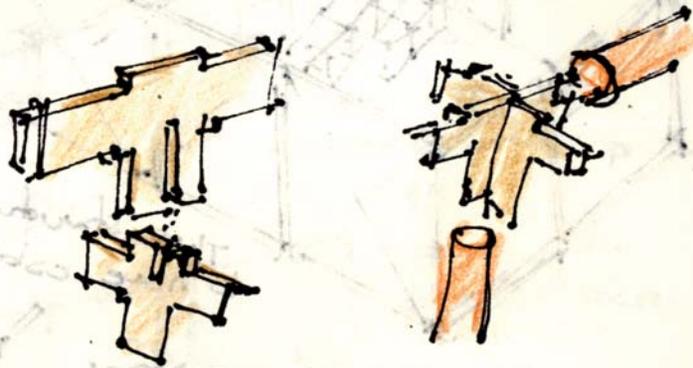
→ plywood
→ BRACING ROPE.
→ FASTENER.
→ BEER CRATES.
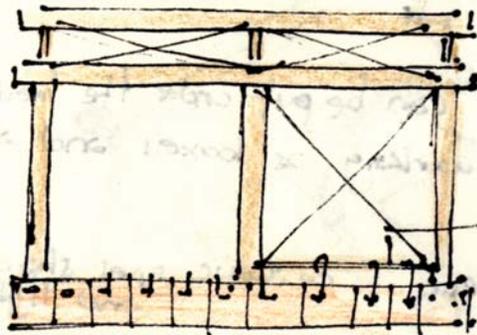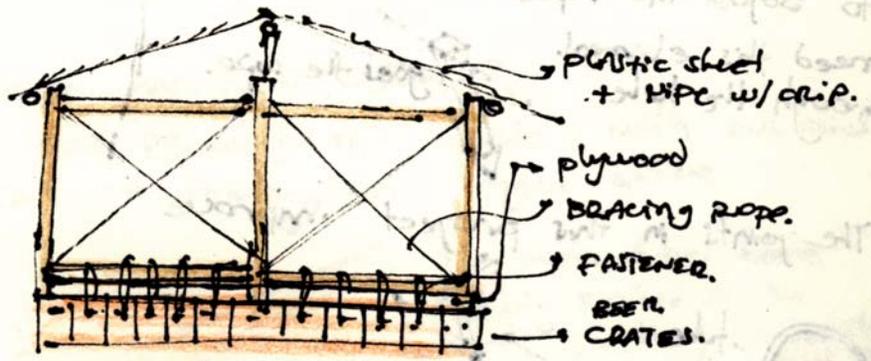
in this extra paper tube the bracing rope can be pla[ced]

→ bracing rope.
→ paper tube
→ woven bamboo sheet.
→ paper tube
→ wood conecter it nail.
→ plywood.
→ fastener

BEER CRATES
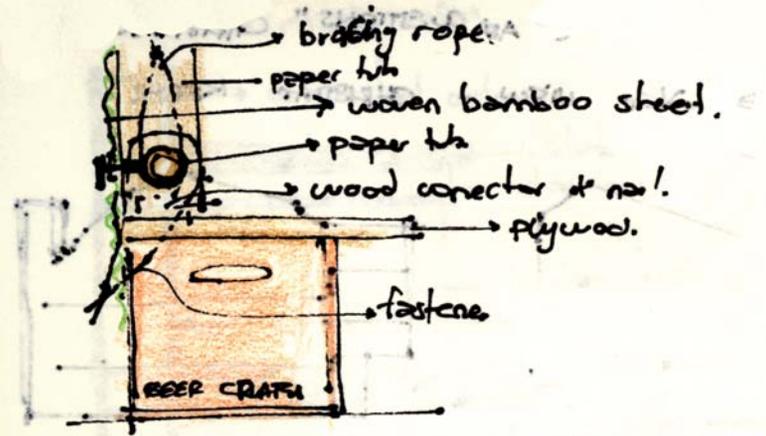
· The exterior to conform the walls are cover by woven bamboo sheets.

· It is important to use bracing rope for the struct and fastener to fix the crater with the tube

· The roof is made / covered with plastic and palm leaves.
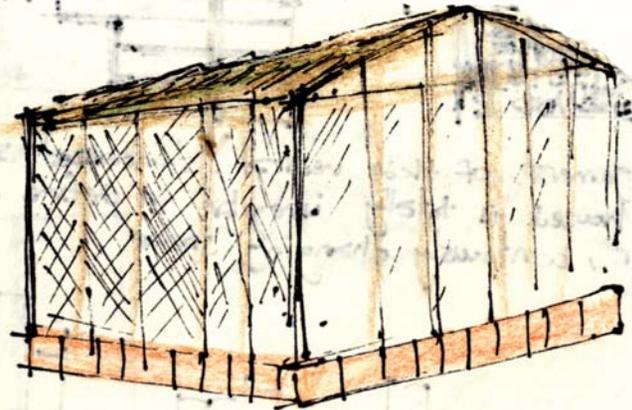
· The woven bamboo sheets should be nailed to the paper tube structures.

04

COMMUNITY HOUSE "RENACER DE CHAMANGA"

Architect:
RAMA Estudio

Location:
Chamanga, Esmeraldas, Ecuador

Project Year:
2016

Area:
180 m² (1938 sq ft)

The Community Center for Chamanga was designed through a community participatory approach. This space was used to house 30 families with a total of 170 people. The project was considered as a wide roof where diverse communal activities can happen. The community and the architects sought to revalue the local materials and develop a safe construction system with guadua cane.

Figure 34. Community House for Chamanga [34]

Figure 35. Community House for Chamanga [35]

Figure 36. Community House for Chamanga [36]

Figure 37. Construction Process Community House for Chamanga [37]

05

PAPER PARTITION SYSTEM 4

Architect:
Shigeru Ban
Voluntary Architects' Network

Location:
Iwate, Miyagi, Fukushima, Yamagata, Nigata, Nagano, Tochigi; Japan

Project Year:
2011

To provide shelter after the Great Japan Earthquake and Tsunami of March 11, 2011Band developed his fourth prototype of the Paper Partition System. In this iteration the connectors are elegantly efficient, nails are no longer required. The walls were formed by panels of cotton fabric that could withstand regular opening and closing, in addition to being able to be opened on any side or omitted between two units to accommodate a larger family. 2000 of these partitions in 50 refugee facilities were erected.

Figure 38. Paper partition system joint [38]

Figure 39. Paper partition system module [39]

Figure 40. Paper partition system [40]
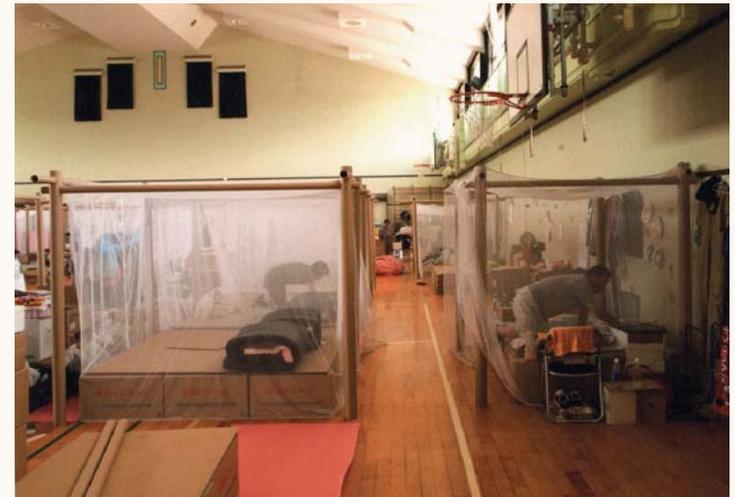
Figure 41. Paper partition system [41]
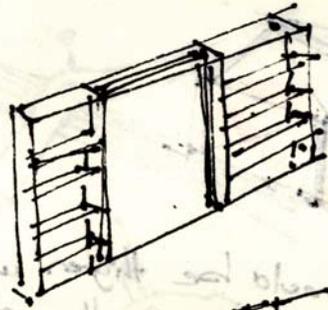
storage as part of
the walk

post-tsunami
reconstruction project
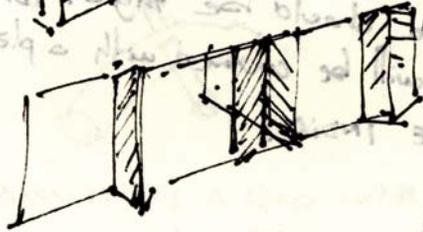
WORK WITH
FOLDING DOORS

* PAPER PARTITION SYSTEM 3.
To give privacy this modules with curtains
can be displayed in bigger spaces
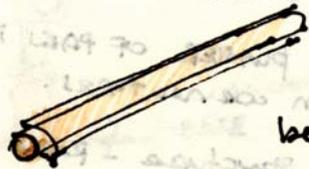
The paper tubes have
already rolled in the
curtains so they can easily
be displayed.
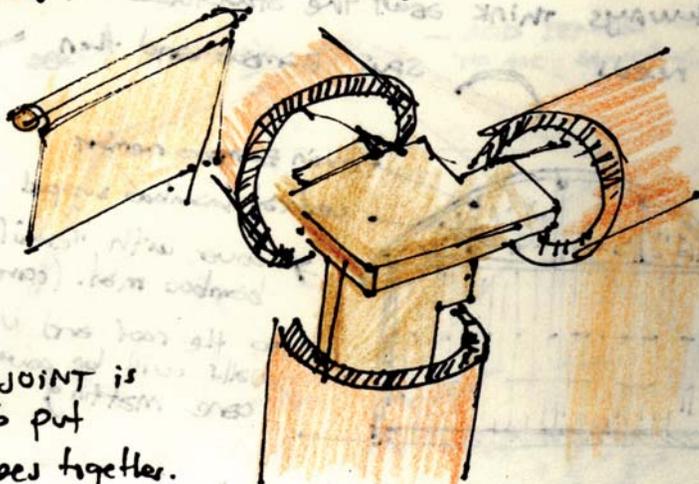
A WOOD JOINT is
needed to put
the 3 tubes together.
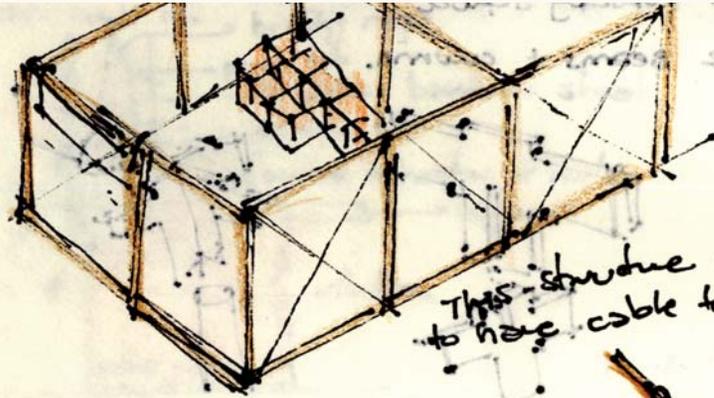
This structure also needs
to have cable tensors.

This cable tensors are ropes
to adjust this ropes to the floor.
need this element.
through the hole   goes the rope.
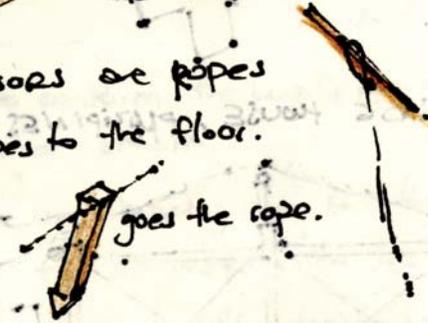
The joints in this project improve

tube

rope.
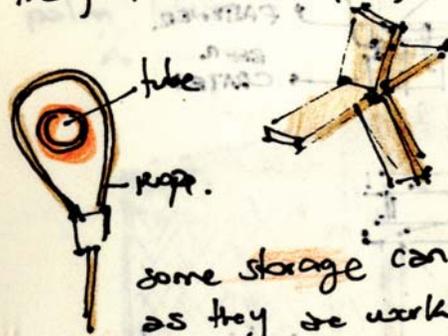
some storage can be put under the beds
as they are working as boxes and also
base supports

CARDBOARD CATHEDRAL — ceiling gives shadows
and light
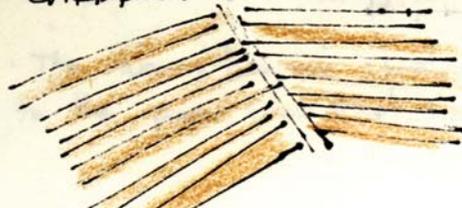
As it gives some space
between the paper tubes
used for the ceiling.

20

SHELTER 48:00:00

BRIEF

The goal was to design a life-support unit which can be transported and deployed quickly and effectively in the immediate aftermath of a natural calamity, to save lives in the critical 48 hour zone and beyond. The key concepts to consider were: logistic, assembly, relation to ground, adaptability, capacity, resilience, materials.

CONTEXT

A 7.8-magnitude earthquake struck northern Ecuador at 6:58 pm local time on 16 April 2016. The human toll of the earthquake estimated by RefliefWeb, specialized digital service of the UN OCHA, is registered as 668 deaths, eight missing people and 6,274 people with severe injuries. More than 230,000 people were wounded and more than one million people were directly or indirectly affected by the earthquake. Approximately 35,000 homes are classified as destroyed or damaged and 140,000 people lack adequate housing. By mid-October 2016, about 16,000 people were still staying in shelters and displacement sites.

GENERAL DETAILS

|	
Location:	Chamanga, Ecuador
Human settlement type:	Rural
Scale:	Shelter prototype, community development
Time condition:	Temporal / Transitional
Construction time:	48 hours after after the disaster

PROPOSAL

This project is one part of my graduate thesis which is searching an architectural approach towards three resilient scenarios: post natural disaster shelters, postwar camp settlements, and slums.

Time, resilience, and community are the main concepts involved in this proposal of a Post-Earthquake shelter. It is designed to be located in Chamanga, a small rural town in Ecuador. However, I believe this design is suitable to different places that depicts similar conditions. Ecuador was hit by a 7.8 Mw. Earthquake on April 16, 2016. Widespread damage was mainly caused across the northern part of the coastal region of the country.

The proposal provides a rescue shelter with multifunctional spaces. The main goal is to create a versatile, lightweight, and compact constructive system that will be easy to transport and deploy. The design follows an initial module (14ft x10ft) that creates proportional spaces which change their width in relation their function. Two shelters built with the basic module house the registration center and the storage area. The dining facility and the medical facility use a double module structure. The fourfold module is used to build three communal sleeping shelters. All these modules will be built with folding bamboo structures, whose concept came from the "folding wagon carts". In addition, every module will be provided with portable lighting fixtures (similar to bicycle lights). The interior furniture, specially the one related to storage, has been designed with crates.
An additional truck, with the concept of a mobile truck, has been designed with a kitchen, a bathroom and a system of fresh, grey, and black water holding tanks.

FURNITURE?.
• FOLDING TABLES
• CUBES WITH 2 FUNCTION. OR MORE
SIT AND STORAGE.
MATRESSES.

MAYBE ALL THE THINGS CAN BE CARRIED AND PUSHED BY THE FORCE OF THE TRAILER

It will be better to fit kitchen & bathroom in the center and the walls could fold to become floor.

TRAILER STYLE.

FOLDING WAGON

COMMUNAL.
BATHROOM
KITCHEN
PLUMBING SOLUTION.

RETRACTILE TENTS.

ONE BIG ROOF = DIFFERENT ACTIVITIES.

SHELTER. 48:00:00

MATERIALS:
• PAPER TUBES.
• "GUADUA" BAMBOO.
• PLYWOOD JOINTS.
• TENSOR CABLES/ROPES.
• WOOD BASES.

✗ AVOID PREFABRICATED shelters made of provisional materials turn to dense fabric of district.

✔ Minimum support to provide revival of life.

✔ LOGISTICS

✔ DESIGN: space saving fridge
• electric stoves.
OR PROPANE STOVES and ovens.

✔ Need a freshwater tank to ration water. need a pump.

✔ spacious counterTop

LIGHT INCORPORATED IN THE DESIGN. WITH BATTERIES INCORPORATE TO ROLLS OR BEAMS.

IT SHOULD BE ELEVATED. MAYBE WITH BEER CRATES? LOGS? ADJUSTABLE LEGS?

TIRES?

STORAGE AS MODULES (LEGUS).

FOOD AND NON FOOD.

SHELTER AS A MIX OF DIVERSE MODULES.

OR ONE MODULE WITH DIFFERENT DIVISIONS.

23

→ CONCEPT : SIMPLE BUT POWERFUL.
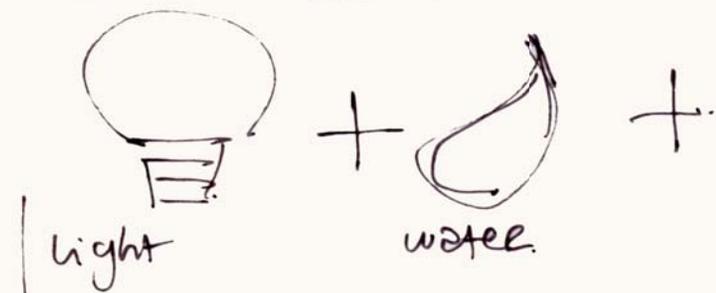
light + water. + multi functional. and interlink. + comunity network.
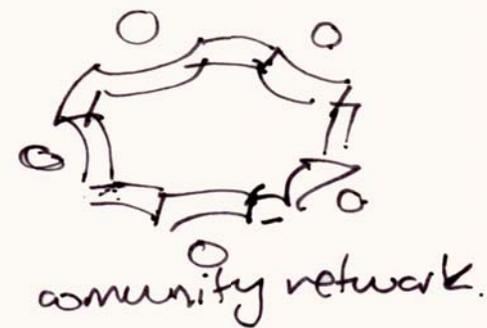
EXECUTION :

IDEA / CONCEPT TO DESIGN.
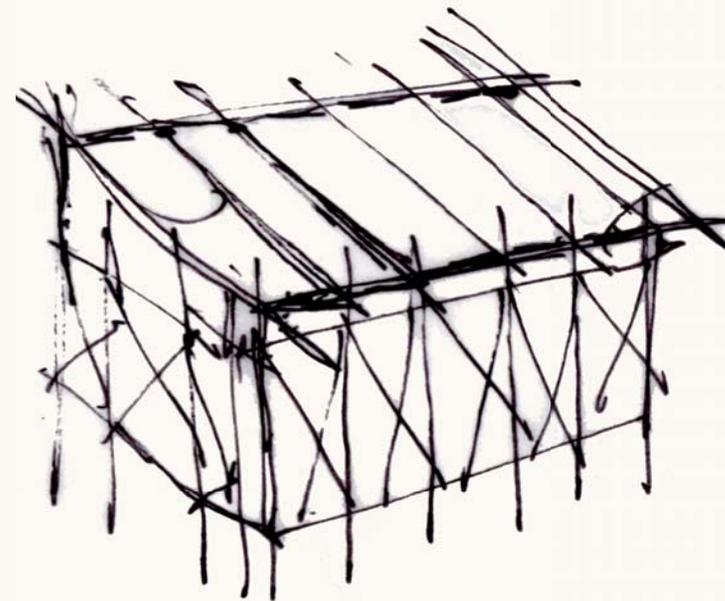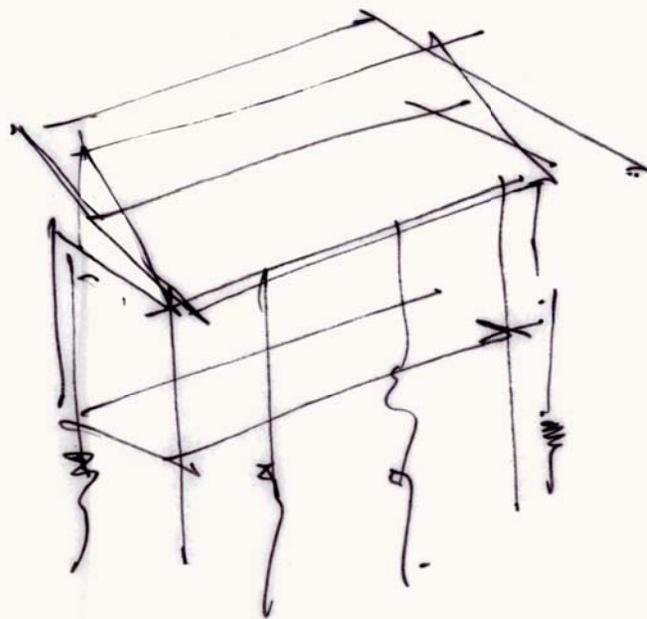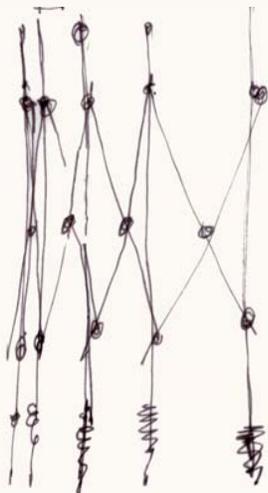
PHASE 1: Transport preloaded materials

Truck A

12'*7'*17'

Truck B

12'*7'*17'
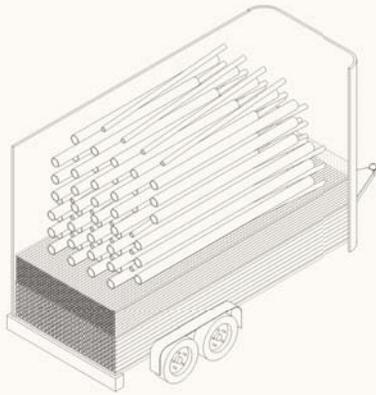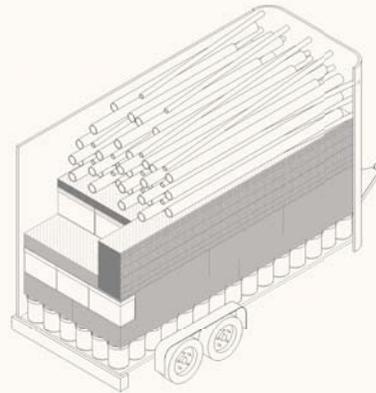
Truck C

10'*7'*17'
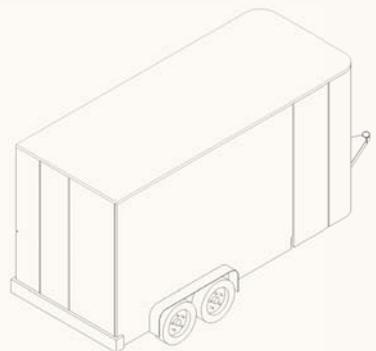
PHASE 2: Unload and list materials for seven modules
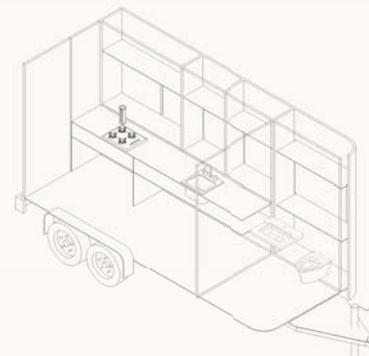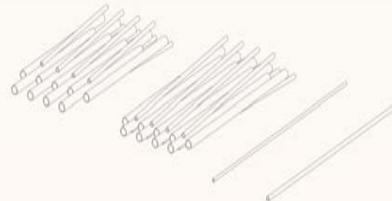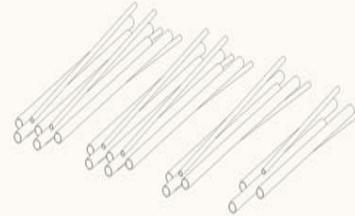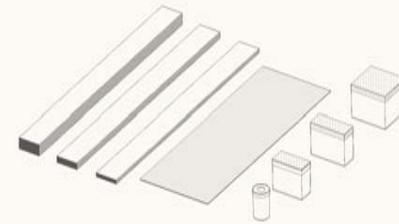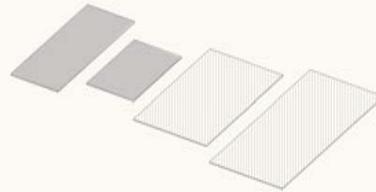
120	8'x 3'3" bamboo floor and roof panels
240	5'x 3'3" bamboo floor and roof panels
36	5'x 8' woven bamboo wall panels
36	5'x 10'6" woven bamboo wall panels
03	rolls of 48'x16' water resistant canvas
02	rolls of 24'x16' water resistant canvas
02	rolls of 16'x16' water resistant canvas
14	rolls of 13'9"x10'6" 60% knitted mesh
90	paint cans for foundation footings
03	tool boxes 1'6"(h) x 1'(w) x 2'6" (l)
03	tool boxes 1'6"(h) x 2'6" (w) x 2'6" (l)
02	tool boxes 1'6"(h) x 1' (w) x 2'2" (l)
02	folding bamboo module 9'6"(h)x 10'(l)
02	folding bamboo module 12'(h)x 10'(l)
02	folding bamboo module 9'6"(h)x 20'(l)
02	folding bamboo module 12'(h)x 20'(l)
03	folding bamboo module 9'6"(h)x 40'(l)
03	folding bamboo module 12'(h)x 40'(l)
360	2" bamboo poles (floor & roof poles)
216	3" bamboo poles (floor & roof poles)
—	kitchen
—	bathroom
—	blackwater plumbing system

25
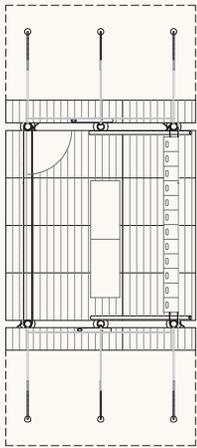
Registration center
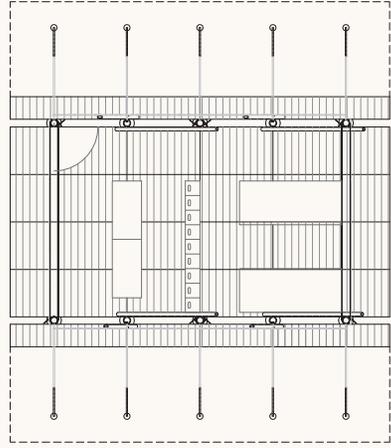
Medical facility
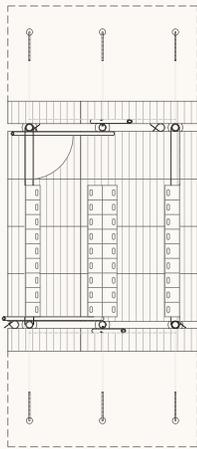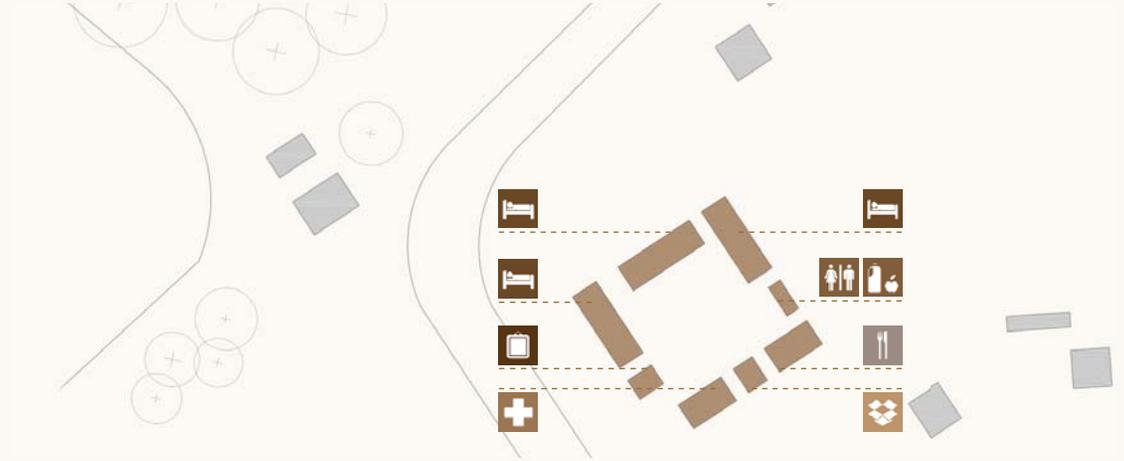
Storage
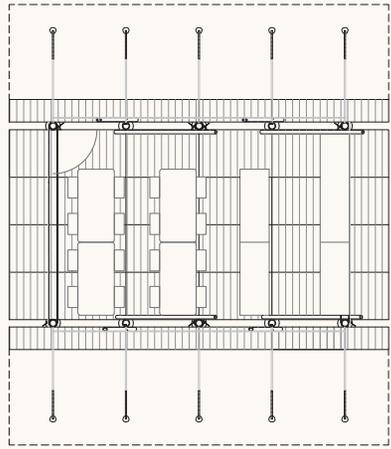
Dining facility
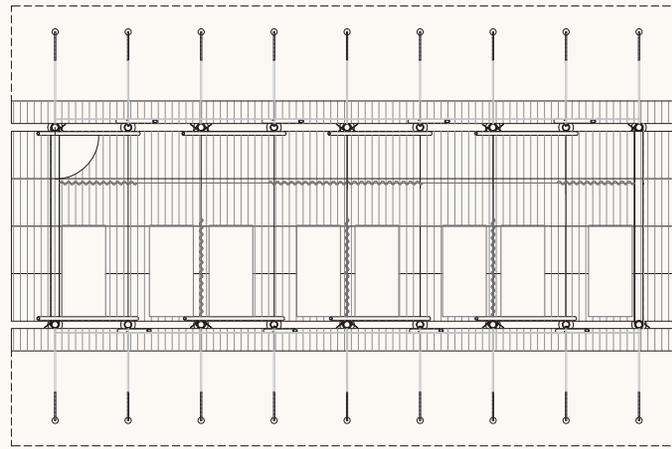
Three comunal sleeping faciltity (capacity: 4 families (20 people) /each
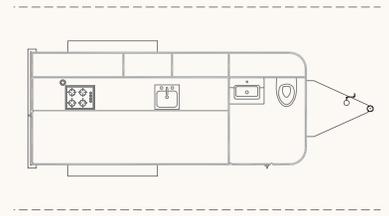
Kitchen and bathroom
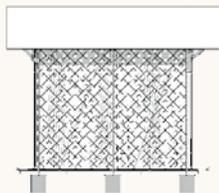
Basic module
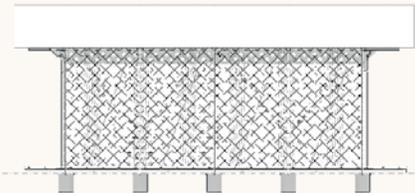
Double module
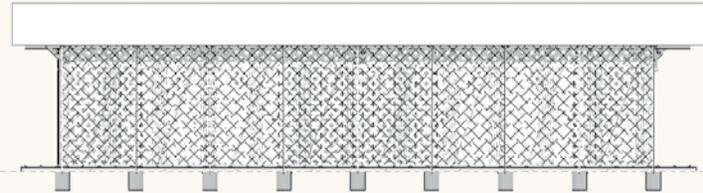
Fourhold module
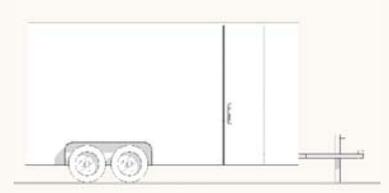
Mobile truck
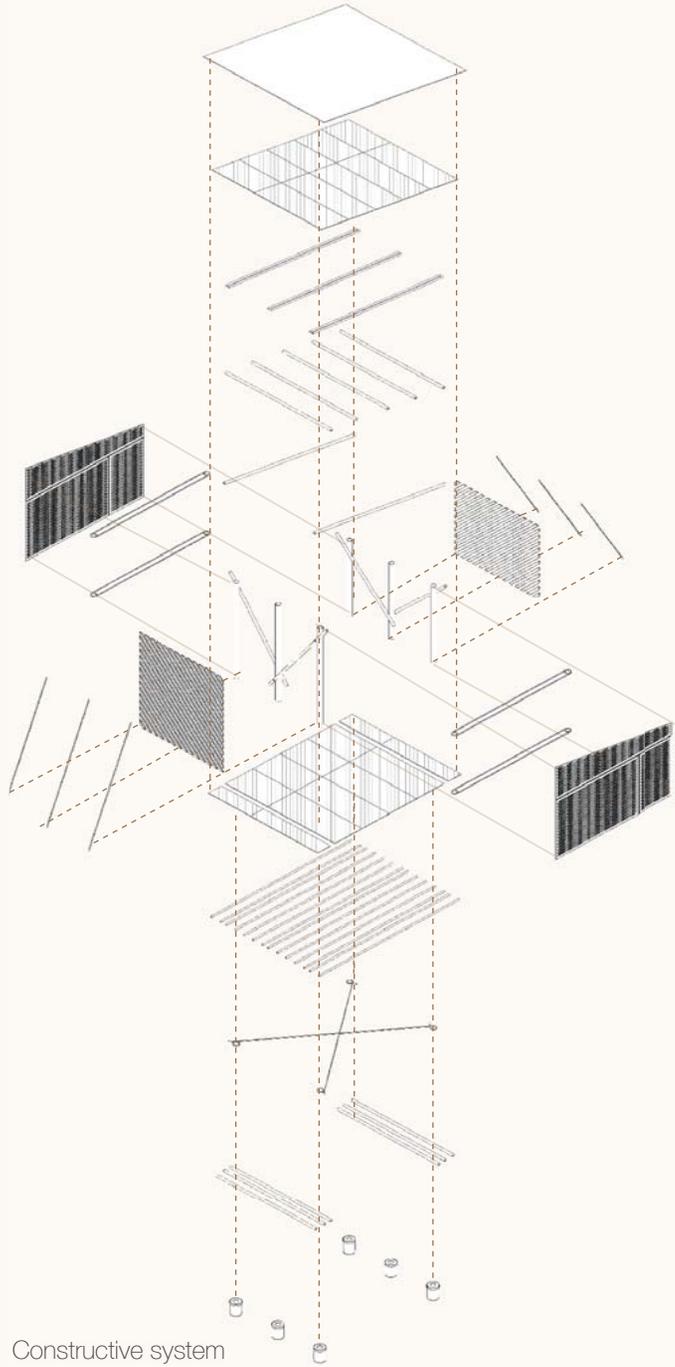
Constructive system
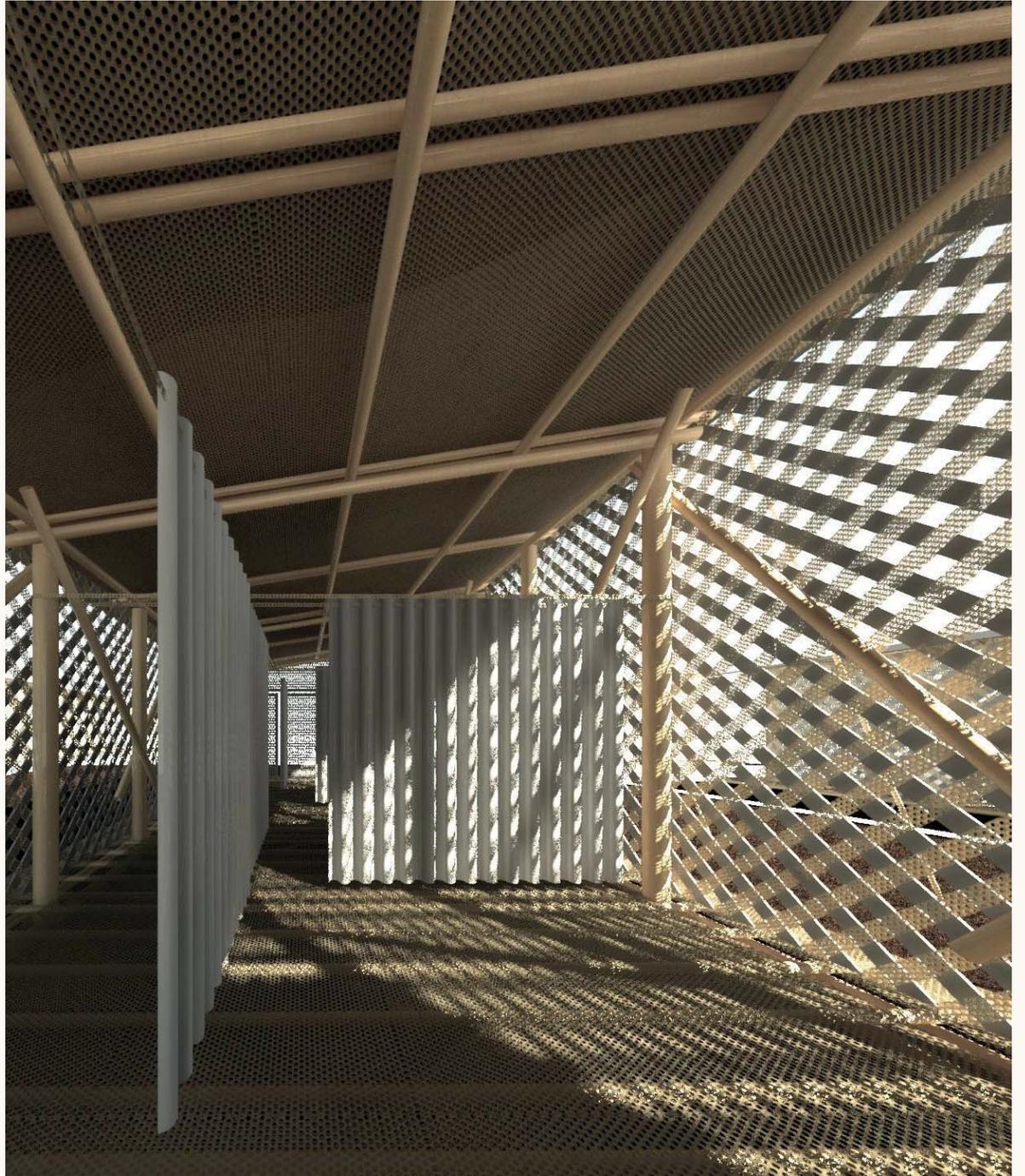
03

Refugee camps

3.1   REFUGEE

In 1951, the UN Refugee Convention was established by the United Nations High Commissioner for Refugees (UNHCR). Under it, the rights of displaced population and the legal obligations of the states to protect them were established for the first time. The protection for refugees guarantees them safety from being returned to danger, access to fair and efficient asylum procedures and measures to ensure that their basic human rights are respected while they secure a longer-term solution.

The 1951 Refugee Convention and Protocol defined refugee as:

> Someone who is unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion.

Asylum-seeker and internally displaced people are two new refugee categories that have emerged in the last decades.The UNHCR defines an asylum-seeker as someone whose request for sanctuary in a foreign country has yet to be processed. Internally displaced people (IDPs) are who have not crossed a border to find safety. Unlike refugees they look for protection in their same country.

By 2016, 65.6 million people have been forcibly displaced worlwide. This gives an average of 28 600 people a day forced to flee their homes becuase of conflict and persecution. The 2015 Global Overwiew published by the Internal Displacement Monitoring Center (IDMC) stated that the majority of the increase in new displacement during 2014 was the result of protracted crises in Democratic Republic of the Congo, Iraq, Nigeria, South Sudan and Syria. In total, these five countries accounted for 60 per cent of new displacement worldwide.
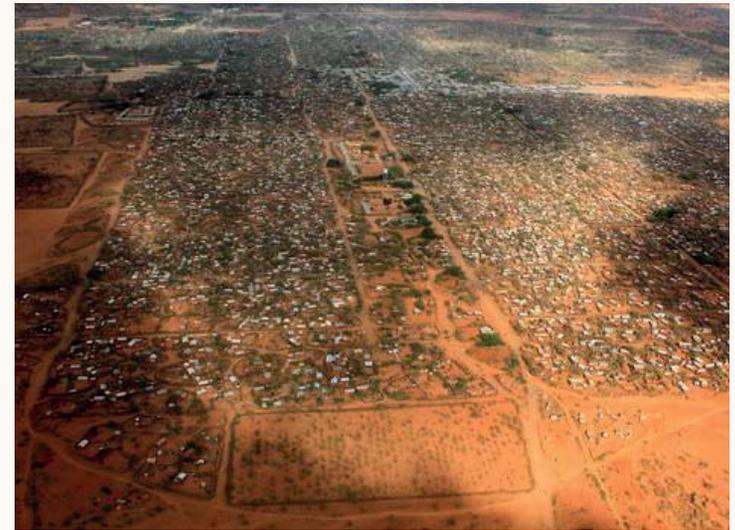
Figure 42. Aerial view of the Dagahaley camp in Dadaab, Kenya [42]

Figure 43. Close-up Dagahaley refugee camp in Dadaab, Kenya [43]

3.2   REFUGEE CAMPS

Manuel Herz, head of the Contemporary City Institute at ETH asserts that people have been migrating across territories seeking sanctuary and fleeing from conflict, natural disasters, or other causes to more favorable regions ever since the dawn of time.

Refugee camps have become the protective and safe place that provide shelter, food and health safety to all kinds of survivors and fugitives. These places are generally conceived with the condition of being transitory. They are set up with the belief that the return of refugees to their homeland is imminent. However, in many refugee situations the return does not materialize and temporariness transforms into a quasi-permanent condition with improvised structures that struggle to provide response to refugees' basic needs.

Temporary clusters worldwide have become permanent neighborhoods. For instance, in 1991, the UNHCR established a complex of camps close to Dadaab, Kenya (Figure 36) to provide shelter for people fleeing Somalia due to the Civil War. It was contemplated as a temporary solution, but it has become one of the oldest and largest refugee camps in the world with almost 330,000 people.

According to Herz, the core of the problem is that refugee camps are designed following quasi-military with quasi-medical principles ignoring the particular features of each social and geographical context. As a result, temporary clusters within several months turn into improvised neighborhood and rows of prefabricated shelters made of provisional materials laid into a dense fabric of districts.

Figure 44. Prefabricated shelters in refugee camps [44]

Figure 45. Interior view tent in a refugee camp [45]

01

PAPER EMERGENCY SHELTER FOR UNHCR

Architect:
Shigeru Ban, Keina Ishioka

Location:
Byumba Refugee Camp, Rwanda

Project Year:
1999

Figure 46. Paper Emergency Shelter for UNHCR [46]

Figure 47. Paper Emergency Shelter for UNHCR [47]

Rwanda's 1994 genocide devastated homes and left two million refugees, many of whom were escaping to Tanzania and Zaire. Ban devised a paper-tube support for the trap roofs provided by the UNHCR. This building system would be compatible with the mountainous terrain and the elements. The dwellings were anchored into the hilly terrain for stability. Ban devised plastic joints and connections that could be assembled quickly on site. He figured the size and configuration of his frame to create maximum possible shelter space with the available tarps.

Figure 48. Paper Emergency Shelter for UNHCR [48]

Figure 49. Paper Emergency Shelter for UNHCR [49]

PAPER emerging shelter for UNHCR.

ROOF assembly

PAPER TUBE JOINTS
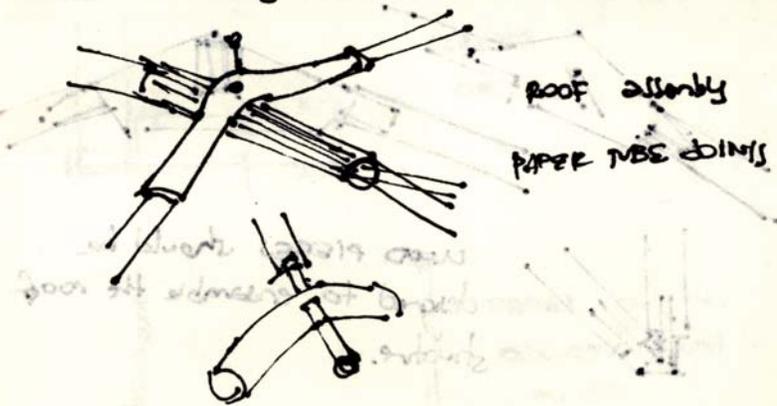
UNDERSTAND IT AS A LEGO with IN and OUT FOR each piece.

PLASTIC JOINT.

ANCHOR
BASE
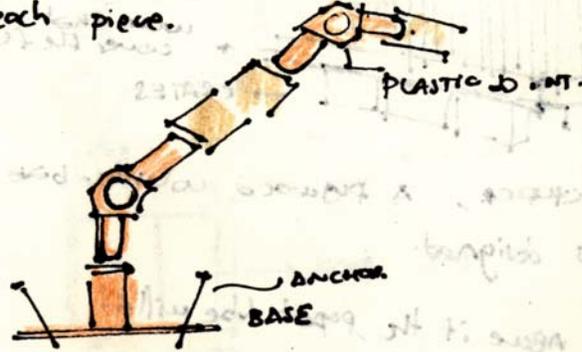
THINK ABOUT STRUCTURE.

— ADD TENSOR CABLES TO THE STRUCTURE.
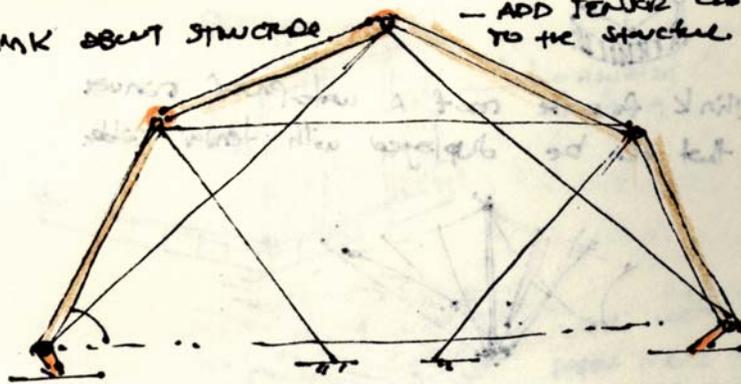
All the joints are fasten with ropes that surrounded them.
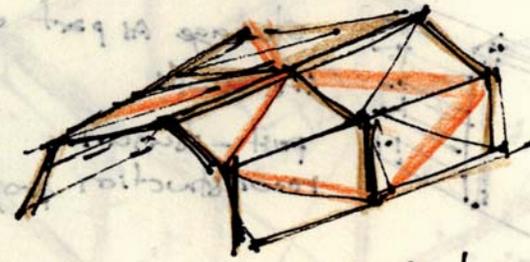
All the structure should be thigten wit tensor cables, it will be covered with a plastic sheet.

→ PAPER LOG HOUSE INDIA.
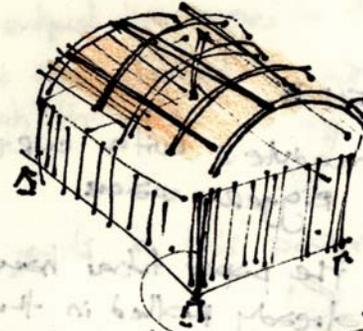
SPLIT BAMBOO PURLINS
COVER WITH:
1. CANE MATTING
2. THICK PLASTIC
3. CANE MATTING.

PLASTER OF PARIS is poured in corner TUBES.

ALWAYS think about the structure - ROOF needs   SPLIT BAMBOO and then
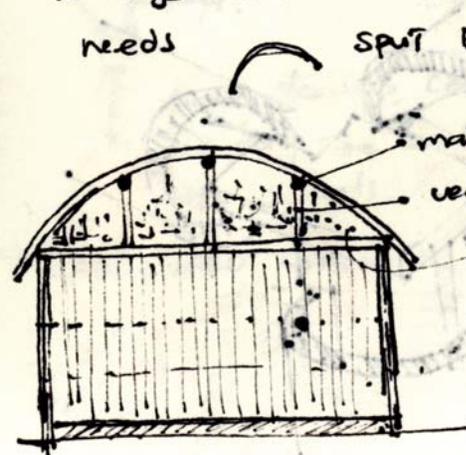
main Bamboo member

vertical bamboo support

cover with "esterilla" bamboo mat. (cane matt)

so the roof and upper walls will be covered with cane matting.

02

SOE KER TIE HOUSE

Architect:
TYIN Tegnestue

Location:
Noh Bo, Tak, Thailand

Project Year:
2009

Budget:
$1 650 per unit

In 2008 TYIN travelled to Noh Bo, a small village on the Thai-Burmese border. The majority of the inhabitants are Karen refugees, many of them children. In the site, six sleeping units were built to shelter 24 children. The bamboo weaving technique used on the side and back facades is the same used in local houses. Important principles like material economization and moisture prevention were considered in the design.

Figure 50

Figure 51

Figure 52

Figure 53

03

SCHOOL FOR SYRIAN REFUGEES

Architect:
J. Lobos, M. Di Marco, M. Bo Rubino, A. Maggiolo (Emergency Architecture & Human Rights)

Location:
Zaatari Village, Jordan

Project Year:
2017

Area:
28 m2

Emergency Architecture & Human Rights is building sand-bag schools to host Syrian and Jordanian children in Za'atari village outside the Za´atari refugee camp. The classroom was built with the superadobe technique. The construction is inspired in the Great Mosque of Djenné, and in the vernacular Syrian beehive houses.

Figure 54. School for syrian refugees [54]

Figure 55. School for syrian refugees [55]

Figure 56. School for syrian refugees [56]

Figure 57. School for syrian refugees [57]

COMMUNITY CENTER FOR SYRIAN REFUGEES

Architect:
Bonaventura Visconti , Leo Bettini

Location:
Greece

Project Year:
2017

Area:
200 m2

The communal space offered by the Maidan Tent will allow the community a place to play, interact and achieve empathy under a portable and protected structure. The refuge's standardized components allow an easy installation and maintenance. Its eight modular spaces can be adapted to a wide range of uses. This tent is built with aluminum structure and covered by textiles resistant to water, wind and fire, offering a protected and safe environment.

Figure 58. Community center for Syrian refugees [58]

Figure 59. Community center for Syrian refugees [59]

Figure 60. Community center for Syrian refugees [60]

Figure 61. Community center for Syrian refugees [61]

MOSUL POSTWAR CAMP

BRIEF

Arch storming, the promoter of the competition looked for proposals to create an infrastructure that provisionally shelters all the refugees who wish to return to Mosul while their homes are rebuilt and the city regains its living conditions.

The competition promoted two areas of design:
*   Urgent humanitarian aid: emergency, psychological help, food, storage, massive housing, religious worship and leisure.
*   City reintegration zone: individual housing, public spaces and sports, religion, culture, education and health care facilities.

CONTEXT

Like the rest of Iraq, Mosul city and its surrounding areas have witnessed a growing wave of extremism and sectarian and ethnic violence following the collapse of the former regime in 2003. Insecurity and ethnic and religious conflict have reshaped Mosul's demographics, and vastly affected the functionality of its local administration, public institutions and economic establishments.

GENERAL DETAILS

Location: Mosul, Iraq
Human settlement type: Urban
Scale: City
Time condition: Temporal and Permanent

PROPOSAL

Community, privacy, and resilience are the main concepts involved in this proposal. The competition proposed two separated areas: infrastructure for urgent humanitarian aid, and city reintegration zone. However, the reality portrayed in several refugee camps shows how temporary structures tend to become permanent. For this reason, in our proposal provisional shelters which are part of the permanent urban fabric have been implemented.

Geometric patterns inspired from the area's artistic heritage define the city's urban grid. The modification of the ground was performed in order to handle the water level: setbacks and terraces along the river are components of the new topography. This design mitigates flood risk and creates public spaces along the shore.

Bridges, symbols of unity and of new beginnings, are an important feature of this proposal; they as well as the mosque and the public buildings they will become landmarks of the reemerging city. The structures used as temporary shelters during the first urgent humanitarian phase will accommodate new functions as markets, schools, medical facilities, in the permanent one.

In addition, the transition from public to private spaces in neighborhoods and houses are obtained with the design of interior courtyards.

A

the

River

B.

BRIDGE.

BACK HOME!

A

PLAZA

B

PLAZA

PLAZA

INTERIOR

EXTERIOR
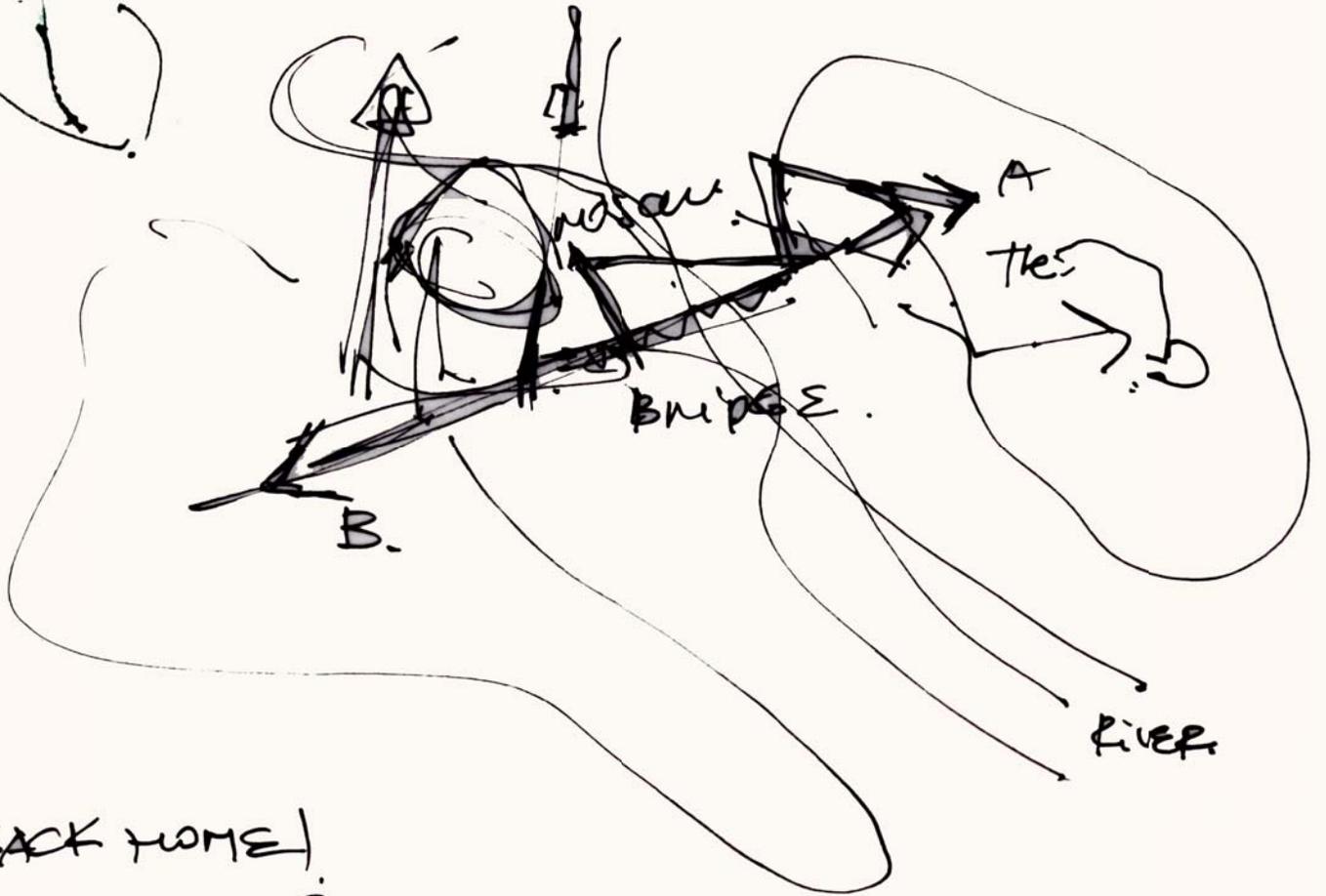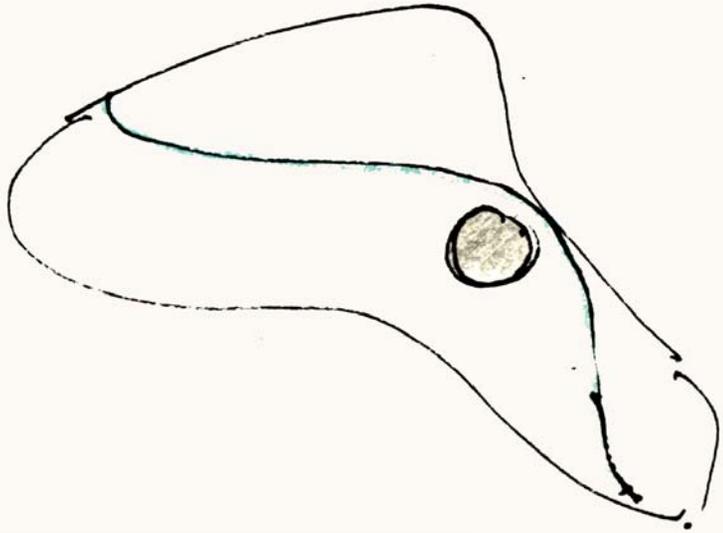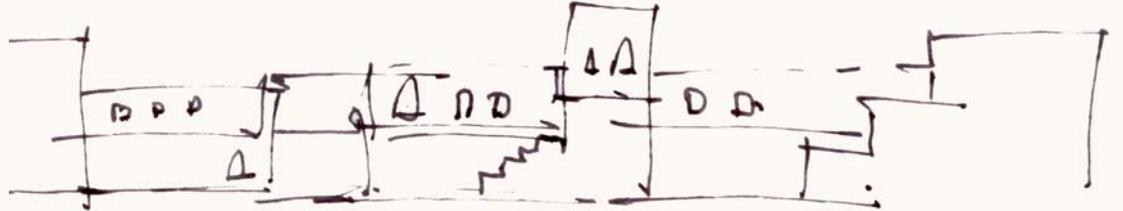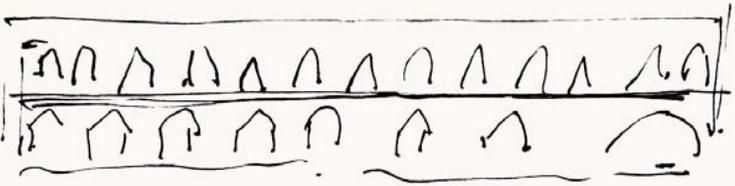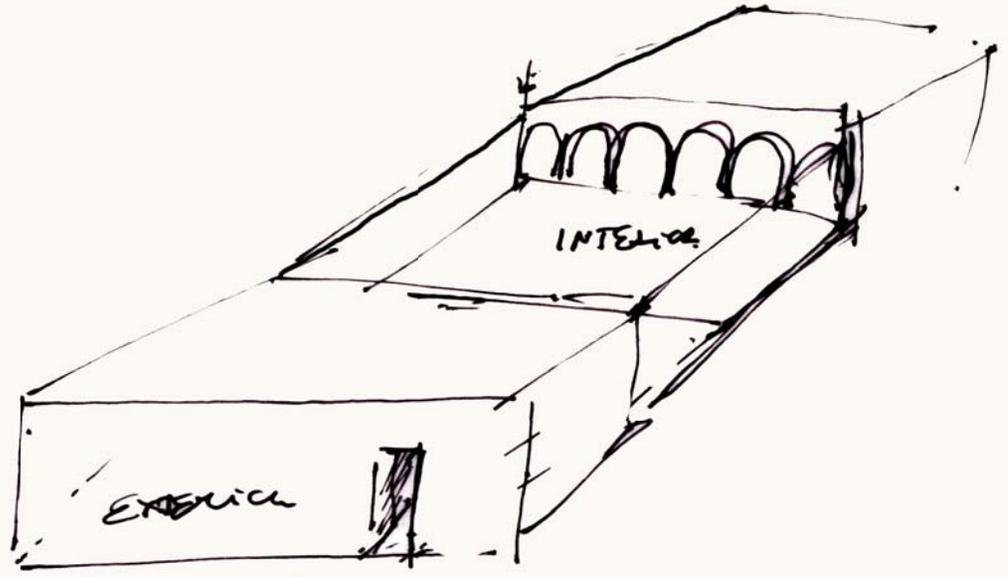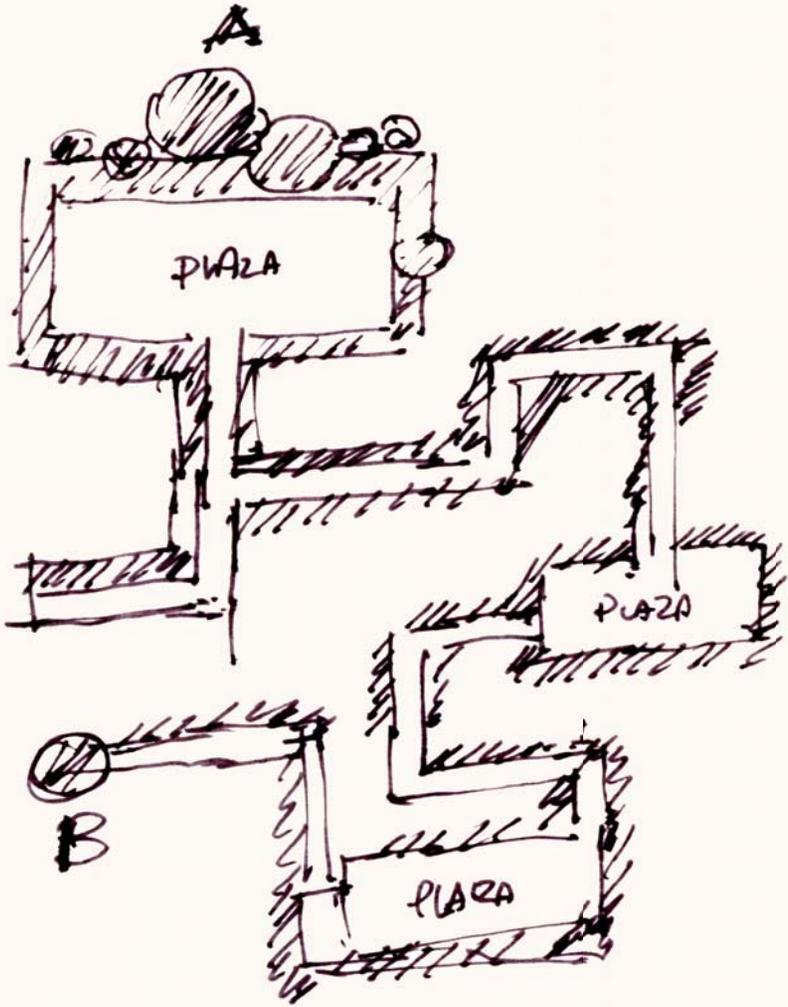
Temporary / Permanent structure

Mosque
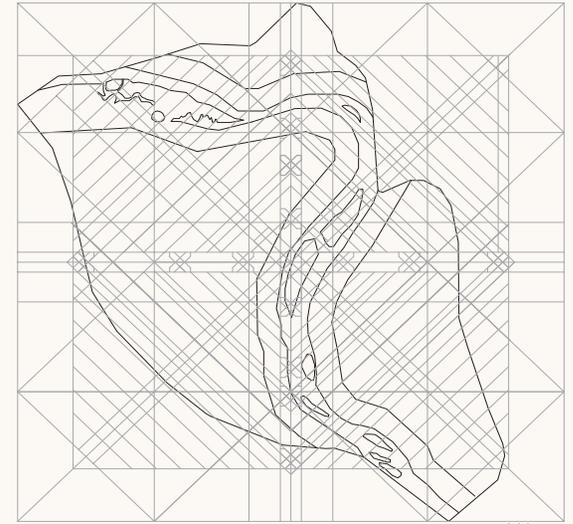
Urban grid
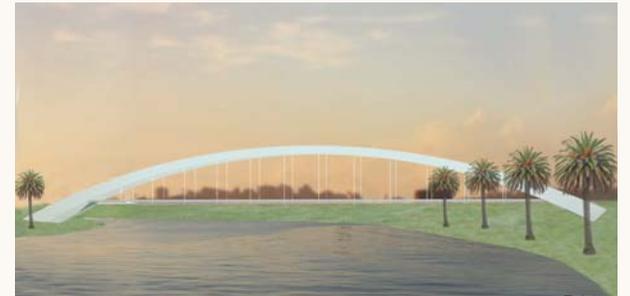
Bridge

Neighborhood

Permanent structure as temporary shelter

Adult training center

Market

Hospital

School

04

Slums

4.1   SLUMS

The Global Report on Human Settlements (2003) defines slums as buildings or areas that are deteriorated, hazardous, insanitary or lacking in standard conveniences. As a complementary definition, the same source use the term slum to refer to inner-city residential areas that were laid out and built several decades ago in line with the prevailing urban planning, zoning and construction standards, but which, over the time, have progressively become physically dilapidated and overcrowded to the point where they became the near exclusive residential zone for lowest income groups.

Slums are the product of social, economic and political factors which are attributable to either direct or indirect state action. They are mainly related to population growth, rural-urban migration, weak urban policies, economic vulnerability, underpaid work and lack of affordable housing options for the urban poor. Slums have become a dwelling solution for people that have experienced displacement caused by conflict, natural disasters and climate change and evictions caused by redevelopment pressures, gentrification processes and episodes of ethnic cleansing.

According to the World Bank Data, in 1960, 34 percent of the people was living in urban areas; however, in 2016 that percentage has drastically increased to 54. It means that in five decade the urban population increased 20 points. It seems unlikely that the urban development and the formal construction had a parallel growth with the urban population. In fact, in 2013 an estimated 25% of the world's urban population was living in informal settlements, with 213 million informal settlement residents added to the global population since 1990 (UN-Habitat, 2013).

In 2016, 881 milliion urban residents were living in slums conditions, it represents 22 percent of the world's urban population. Slums play an important role in the city and the urban context, but they are often forget as they are considered informal settlements. Their "illegal" situation has left them in the oblivion.

In these places waste is not collected, taxes are not paid and public services are not provided. This lack of secure land tenure affects their access to regular sources of finance to improve their living conditions and to develop their own businesses. Some slum areas are working communities in their own right, with their own economy and social structure, whereas others have stagnated in a reality of permanent poverty.

Slums are known for being dense settlements where overcrowding conditions are common. A sample survey made by the Participatory Slum Upgrading Programme in 2012 showed that the average room occupancy among slum households is four people. Many slums and informal settlements are located in risky or environmentally vulnerable and underserved areas. In relation to housing conditions poor quality and ephemeral durability of materials and lack of privacy are the common characteristics. In the urban context, slums are also known for their lack of public spaces and limited access to education and job opportunities.

According to the Report "Prosperity of Cities" by UN-Habitat, the particularity of slums among informal settlements is the level of perpetual poverty, deprivation and socio-spatial exclusion to which the people residing in them are subjected to live in, a condition that also affects the overall prosperity of the cities and towns in which they exist.

SLUM HOUSEHOLD

UN-Habitat's operational definition for a slum household include all the inhabitants who suffer one or more of the following 'household deprivations': lack of sufficient living area, lack of housing durability, lack of security of tenure, lack of access to improved water source and lack of access to improved sanitation facilities. The two last conditions are the main cause of the death of hundreds of thousands of people from preventable diseases.

4.2   SLUM UPGRADING

Field et Kremer claim that slum upgrading should be a interdisciplinary action focus on physical, social, economic, organizational, and environmental improvements within neighborhoods, where all levels of government, community representatives, civil society, non-government organizations, academia, private sector and, slum dwellers should work together. These interventions include: regularization of land tenure, infrastructure improvements, better provision of health, educational and community services, removal or mitigation of hazards, and home improvements with traditional construction techniques and innovations on sustainable building.

In this type of projects the act of transformation as a process is the ultimate goal. Urban renovation is a buildup of continuous steps that starts when the role of internal factors of a community such as cultural attitudes, social factors, norms and habits and external factors, such as policy/governance influence are considered and understood.

Southworth (2010) recommends to start the transformation in spots that have the potential to integrate the city, promote accessibility and establish a new or positive sense of place. They are mainly related to the collective places where people spend time such as: public transportation centers, pedestrian movement routes, points of social and commercial gathering, community facilities and places of symbolic significance. Their presence help to build more permanent physical settlements, increase the sense of community, enhance social activities, safety and sanitation in the neighborhood.

A people-center and participatory upgrading model is essential to create a more sustainable urban transformation where all urban stakeholders including slum dwellers contribute to build peaceful communities. Diverse studies have shown that in-situ and collaborative slum upgrading is one of the most effective urban approaches.
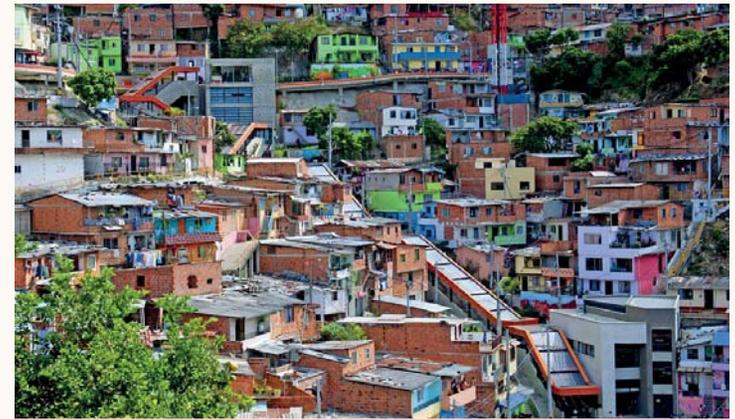
Figure 62. District 13 (Medellin, Colombia) after the slum upgrading program [62]

Figure 63. Favela in Brazil [63]

4.3   UNITED NATIONS PARTICIPATORY SLUM UPGRADING PROGRAMME (PSUP)

The Participatory Slum Upgrading Programme (PSUP) was launched in 2008, as a joint effort of the African, Caribbean and Pacific (ACP) Group of States, the European Commission (EC) and UN-Habitat. According to its website, the program has reached out to 35 countries and 160 cities in Africa, the Caribbean and the Pacific improving the lives of at least 2 million slum dwellers.

The PSUP's approach emphasizes the integration between slum dwellers and the broader urban fabric using city-wide participatory planning methods to improve living standards of urban poor. According to the description given in its website the PSUP looks forward to improve the lives of slum dwellers by changing mind-sets through policy change and delivering relevant information, participatory planning acknowledging the challenge of slums and community aspirations for change, physical improvements to the slum environment and integration into the broader urban fabric.

Its slum upgrading policy is based on management approaches, pilot projects, contributing to policy development and the implementation of institutional, legislative, financial, normative and implementation frameworks. In addition, it gives support to local and national authorities in identifying adequate funding to carry out further slum upgrading activities and expanding programs to be truly city-wide.

To meet these challenges, the PSUP program seeks to harmonize with local and national stakeholders on key slum upgrading projects through creating a network for local, country level and regional slum upgrading challenges. For this purpose, regional training and policy seminars on the program's concept, themes, and methods are organized with all stakeholders involved.

UN HABITAT promotes a sustainable slum upgrading is achievable through concerted and coordinated efforts by all relevant urban stakeholders using a programmatic, rights-based and gender sensitive approaches that seek to engage slum dwellers themselves, and, understand, and devise strategies to improve, the urban slum challenges at the national, city and neighborhood levels.

PSUP seeks an inclusive environment through a multi-stakeholder management model where all stakeholders are empowered to participate in defining the future of their towns and cities and meeting the needs of all urban dwellers, with a special focus on the empowerment slum dwellers.

It seems that the PSUP is working hard in its approaches, but it is momentous put in practice all this theory. Finally, all the stakeholders involved in these projects should keep in mind that the essential part of them are communities that claim for development rather than solutions labeled as slum interventions.

01

VIVIENDAS SOCIALES PORTO SEGURO

Architect:
Christian Kerez

Location:
Sao Paulo, Brazil

Project Year:
2009 - 2013

This project provides the same social life as in a favela. Each house has a direct access to the alleys and small squares. There are only five different houses with the same total net area of 55m2, distributed on two or three levels. Each house is built more than eighty times on the site. The arrangement of these vertical, standardized single family houses is totally irregular to define a labyrinthic, continuously changing space. The project was developed together with a research project about the morphology and typology of the favela.

Figure 64. Viviendas sociales Porto Seguro [64]
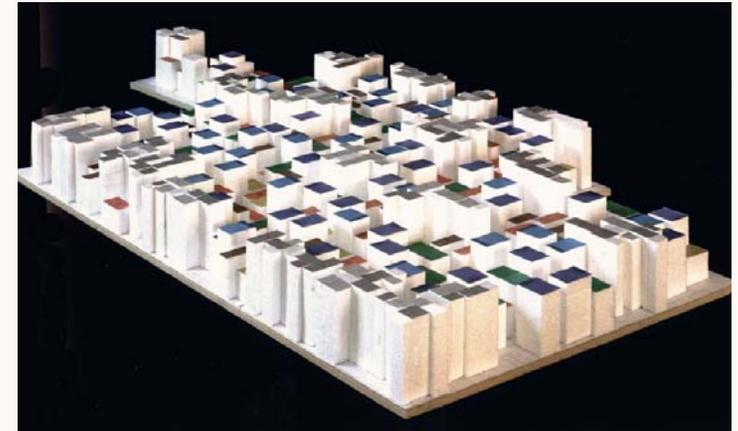
Figure 65. Viviendas sociales Porto Seguro [65]
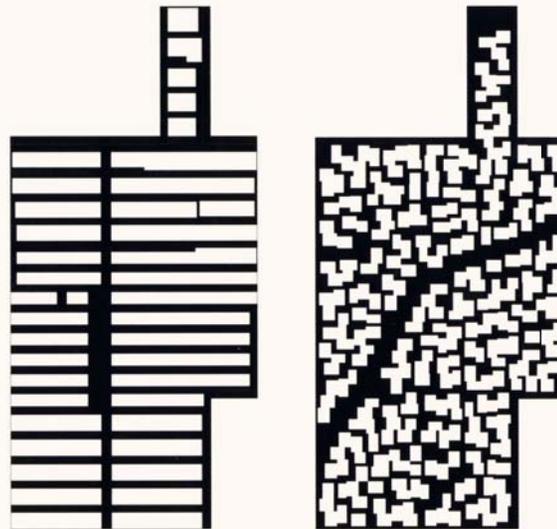
Figure 66. Viviendas sociales Porto Seguro [66]
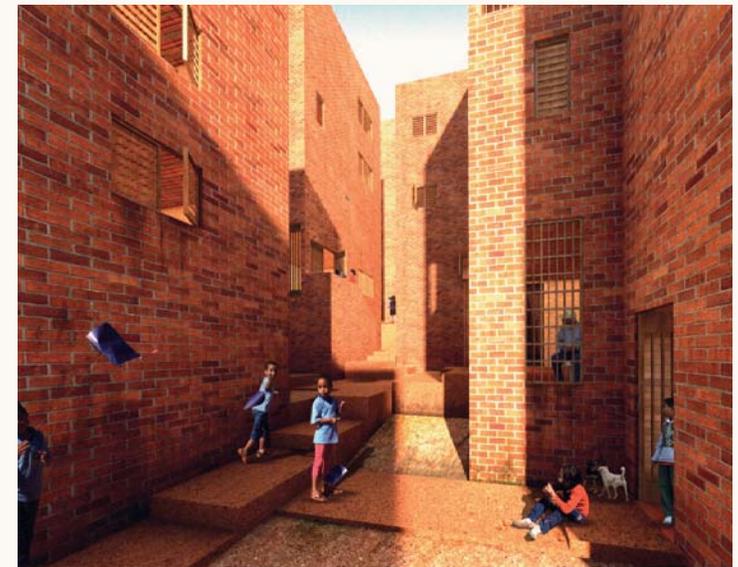
Figure 67. Viviendas sociales Porto Seguro [67]

02

KLONG TOEY COMMUNITY LANTERN

Architect:
TYIN tegnestue

Location:
Bangkok, Thailand

Project Year:
2011

Area:
91 m² (980 sq ft)

Budget:
$5 500

The project provides to the community a soccer court and a public playground. It works as a tool for the community to tackle some of the social issues in the area and it is part of a larger scale development. The intervention is a small contribution that might lead to positive change.

Figure 68. Klong Toey Community Lantern [68]

Figure 69. Klong Toey Community Lantern [69]

Figure 70. Klong Toey Lantern [70]

Figure 71. Klong Toey Lantern [71]

Figure 72. Klong Toey Community Lantern [72]

03

QUINTA MONROY

Architect:
Alejandro Aravena, ELEMENTAL

Location:
Sold Pedro Prado, Iquique, Chile

Project Year:
2003

Area:
5000 m² (53820 sq ft)

Budget:
$10 000 per family

The project accommodated 100 families that had been occupying illegally half a hectare in the city of Iquique in Chile. The solution that finally arose was to build "half" of a good 80m2 (860 sq ft) house rather than a "finished" 40m2 (430 sq ft) house. The half that was built was the one that the families won't be able to do individually.

Figure 73. Quinta Monroy [73]

Figure 74. Quinta Monroy after occupation [74]

Figure 75. Quinta Monroy [75]

Figure 76. Interior view Quinta Monroy [76]

04

INCREMENTAL HOUSING STRATEGY IN INDIA

Architect:
Filipe Balestra, Sara Göransson

Location:
Netaji Nagar, Pune, India

Project Year:
2009

Area:
25 m² (270 sq ft)

Budget:
$5 500 per family

The strategy strengthens the informal and aims to accelerate the legalization of the homes of the urban poor. All proposals are for one family and 270 sq foot area (grant regulations). Also, each house will have a new individual toilet and kitchen. All prototypes need the participation of the community to emerge. Each family is free to choose one of the 3 incremental prototypes.

Figure 77. Incremental Housing Prototype [77]

Figure 78. Incremental Housing Prototype [78]

Figure 79. Incremental Housing Prototype [79]

05

MUMBAI BEYOND THE SLUM AND THE HIGH-RISE

Architect:
URBZ: user-generated cities
Ensamble Studio / MIT-POPlab

Location:
Dharavi, Mumbai, India

Project Year:
2013

The in situ work of URBZ and the inventive explorations of Ensamble Studio/MIT-POPlab draw from a collage of tactics, technologies, visions, and imaginations. Ultra-Light Growth: The instability of the ground, the need for spatial flexibility, and the insecurity tenancy make the idea of growing light for homegrown neighborhoods. Reacting to the lack of public services and the dispirited character of existing urban "rehabilitation strategies". Ensamble Studio proposes Supraextructures as a way to reclaim the air for even growth.

Figure 80. Diagram Ensamble Studio Supraextructure for public space [80]
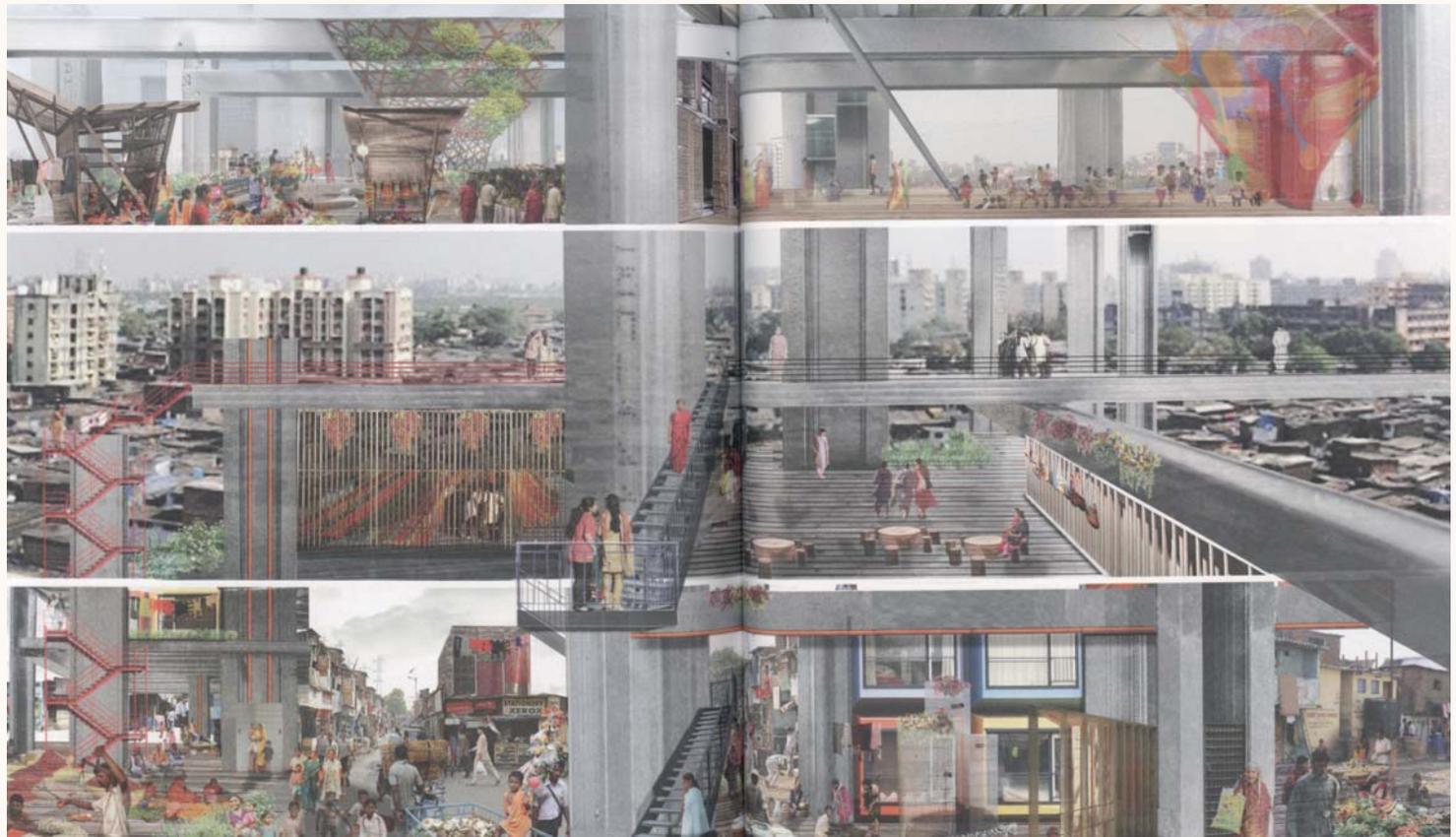
Figure 81. Ensamble Studio Supraextructure for public space [81]

06

THE BIG "U"

Architect:
BIG Team: BIG Bjarke Ingels Group

Collaboration of:
One Architecture, Starr Whitehouse,
Level Infraestructure, Arcadis

Location:
Manhattan, New York, United States

Project Year:
2014

The team's approach is rooted in the two concepts of social infrastructure and sustainability. By proactively cross-breeding public infrastructure with social programs. The Big U is a protective system around Manhattan, driven by the needs and concerns of its communities. The proposed system not only shields the city against floods and stormwater; it provides social and environmental benefits to the community, an improved public realm.

Figure 82. The BIG U proposal after Hurricane Sandy [82]

Figure 83. The BIG U proposal after Hurricane Sandy [83]

Figure 84. The BIG U proposal after Hurricane Sandy [84]

Figure 85. The BIG U proposal after Hurricane Sandy [85]

RESIDE MUMBAI MIX HOUSING

BRIEF

Arch out loud challenges seeks proposals of mixed dwelling develo- pment on one of the last undeveloped sections of Mumbai's coastli- ne. The indigenous fishing community that has occupied the site for hundreds of years and an affluent section of the population are the potential new residents of this site. In addition, the proposals should address additional considerations including the shortage of public open space, threats to the historic and urban fabric and the annual monsoon flooding and rising levels that the site is exposed to.

CONTEXT

Mumbai being the commercial capital of India has seen a tremendous rise in population in the last few decades. The sudden influx of people from all sections of the society has led to an increase in unequal housing opportunities in the city. Along the west coastline of the city is an upscale neighborhood of Worli. It houses the original settlers of Mumbai, the Koli community or the fishing community and a high income group which causes a clear economic segregational housing on an urban fabric.

GENERAL DETAILS

Location: Worli Koliwada, Mumbai, India
Human settlement type: Urban
Scale: Neighborhood
Time condition: Permanent

PROPOSAL

The proposal for the project emphasizes on public space to gather people. The site currently is almost inaccessible due to the erratic unplanned houses of the fishermen. A solution which resolves questions of accessibility to site is resolved by designing an elevated promenade. The design of the promenade is based on natural topographical conditions of the site acknowledging the flooding issues, acts a social gathering space and connects the mixed dwellings with the fort in one continuous loop. In addition, the elevated promenade links the site to old temples and confines further to form a spiral in the water to make way for the fish market and the jetty. The site is envisioned to be connected to the west coast Mumbai waterway project, to invite people into the site and hence to give importance to the Worli fort. This not only creates a secondary access for the residents but also invites people from Mumbai and beyond to experience the Koli community and the Worli Fort.

Three different incremental housing modules for the Koli community have been designed. Each single family dwelling is 516 square foot (48m2) and can double it with future interventions. Each house is provided with a bathroom and a kitchen.

- House A: a 1 story house structured as a 2 story house, allowing the owner to extend the house vertically without structural risks in the future.
- House B: a 2 story house with lateral vacant space, allowing for the owner to increment it in one or two stories.
- House C: a 2 story house with frontal vacant space, allowing for the owner to increment it in one or two stories.

jetry.

create a
pier for
ferry

setback
i-tenna.

80m

viewpoint

temple

existing road.

CITY IN 3 LEVELS!

3

2

1
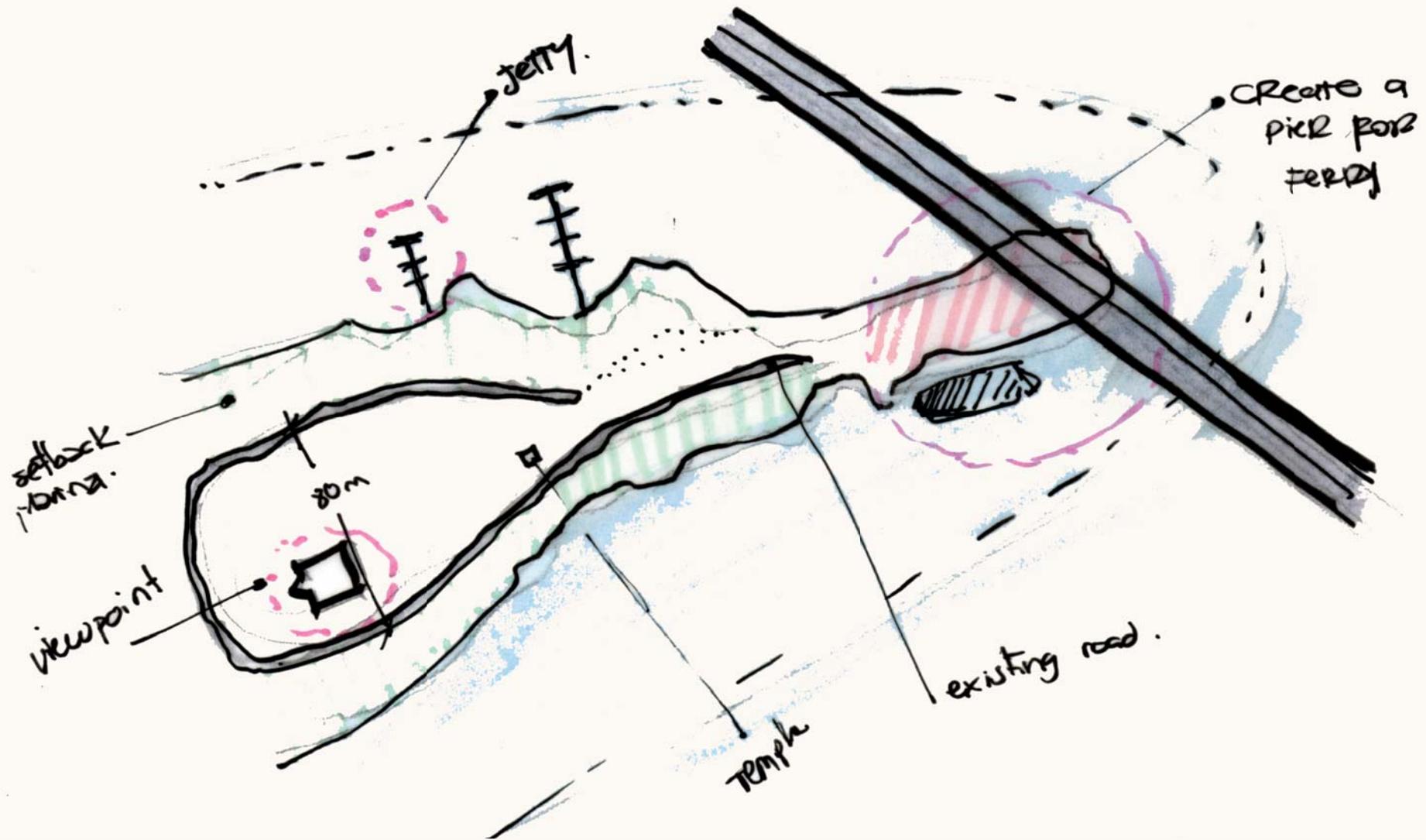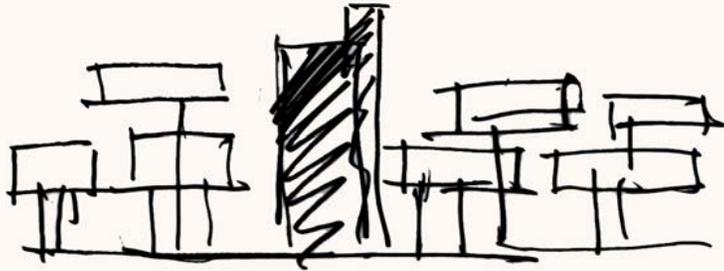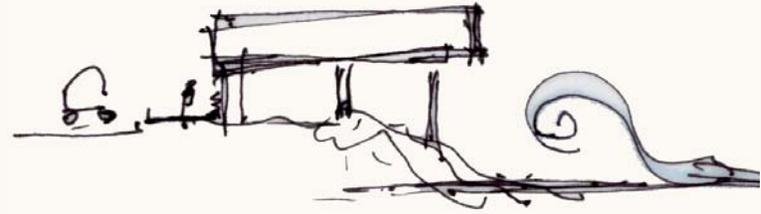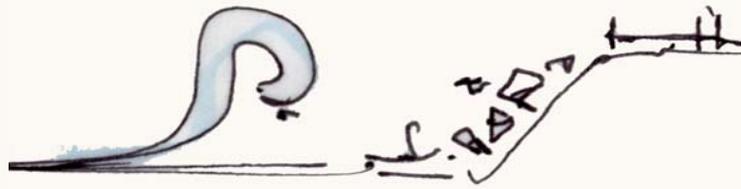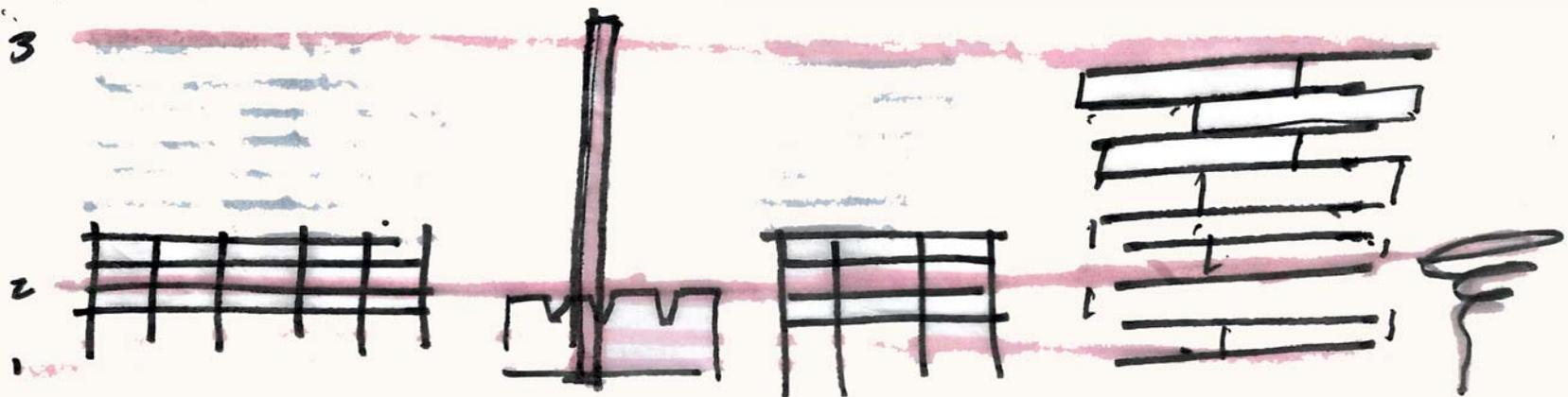
HOUSING:
BUILDINGS. ——→ MIX OF SINGLE & DUPLEX A
DISPLACED FLOORS + CENTRAL CORR.

INCREMENTAL HOUSING: HORIZONTAL (1/2 FLOOR)
VERTICAL (RIGHT/LEFT SIDE,
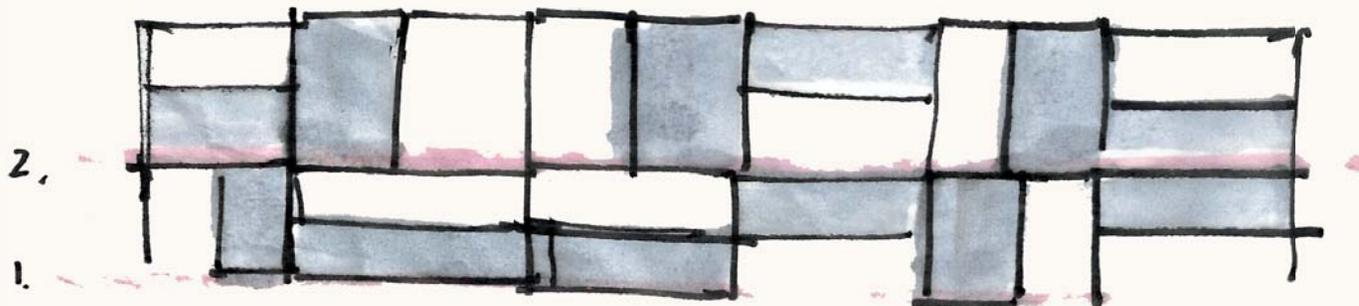
Incremental housing prototypes
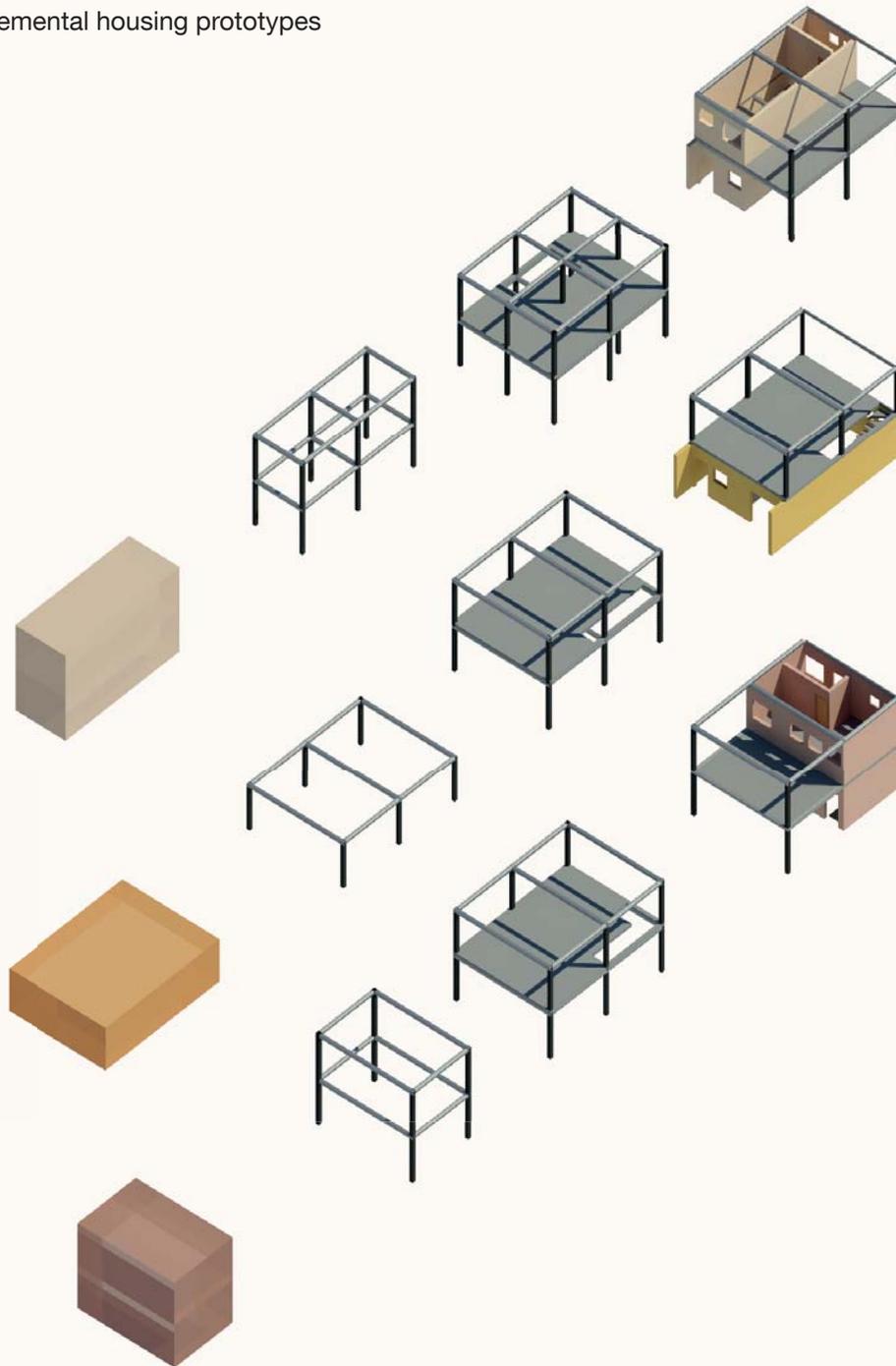
RESULTS

The three projects differ in scale, location and overall features. However, during the design process of each competition similar considerations were contemplated and they determined the final design strategies. These considerations were categorized in three areas: site and context, urban features and culture and society.

SITE AND CONTEXT include five aspects: topography, vulnerability to risk, climate, orientation and local techniques and materials.

- Topography. Responding to topographical conditions with architectural strategies is essential to generate resilient solutions in existing communities. For instance, in the MOSUL and RESIDE competitions the places of the site with deeper slopes were designed to host open public space with social programs. In the SHELTER competition the design is based in an elevated structure that can be adapted to any type of terrain or debris situation.
- Informal settlements in urban areas are often located where topography or flooding conditions make the site′s vulnerabilities challenging to mitigate. As a response to this condition, for MOSUL and RESIDE open public spaces were proposed in the setbacks along the shore. These spaces of transition will leave the space needed to mitigate the flooding risk.
- The use of architectural and urban techniques to create comfortable environmental conditions in cities and buildings is the ultimate result of considering climatic conditions in the design. In the SHELTER competition, overhangs and pitch roofs were included to mitigate the effects of the monsoon season. In the MOSUL competition, narrow streets and interior courtyards were used to provide cooler public and semi-public spaces. In addition, in all the three competitions, cross ventilation was considered in the design of the dwellings.

- Buildings disposition should be an answer to the sun and wind orientation. Moreover, there are additional particular factors that are related to the site orientation. For instance, a mosque should be placed with its front façade towards The Mecca. This consideration was applied in the MOSUL competition.
- Reconstruction should be planned by acknowledging the potential of local materials and traditional building techniques. Learning from them is vital to have an accurate approach to site-related challenges. In the SHELTER competition, bamboo was chosen for structure and cladding due its availability, its structural strength and its sustainable condition.

Accessibility, urban grid, public space, landmarks, historic fabric and infrastructure were the topics analyzed in the **URBAN FEATURES** category.

- Providing roads and bridges to link the site with its surroundings is essential to the revival of forced displaced communities. In the MOSUL competition, the two parts of the city divided by the Tigris River were connected by seven bridges. In the DWELL competition an elevated promenade was designed to link the site with the existing fishing community and the city of Mumbai.
- Street widths, public space disposition, connection between landmarks, hierarchy of routes were designed as responses to local and urban features. The MOSUL urban grid design was based in narrow streets and interior courtyards. These are inherited features from the city's traditional urban planning and are responses to climate conditions and urban and social needs.
- Squares and junctions with a clear transition between public and private spaces were proposed in the three competitions. In the three projects, public spaces are thought to become meeting points of diverse activities and groups of people.

- Landmarks provide external points of orientation in urban landscapes. In MOSUL, the mosque, the public buildings and the bridges are the points of reference of the proposal. The elevated pathway, the jetties, the ferry station and the building for the fish market become an overall landmark in the proposal for the RESIDE competition.
- Being aware of the historic fabric of a site is important to understand its past and insert this knowledge in present and future interventions. In the RESIDE competition, the 17th century fort recovers its condition of landmark in the proposal.
- Forcible displaced populations usually lack basic services and infrastructure. Addressing this need is part of the challenges face in these type of projects. For instance, in the SHELTER competition due to the conditions that come in the aftermath of a disaster, the proposal provides portable lights to each shelter and a mobile module with a restroom, kitchen and a black water plumbing system was part of the design.

CULTURE AND SOCIETY encompass aspects related to religion, social habits, arts and economic activities. Based on these general design considerations particular strategies were considered for each project.

- In some cultures religion plays a major role in urban planning decisions and places of worship become essential in the urban setting. In the MOSUL competition, the Mosque was the center of the urban development proposal.
- A behavior-based design that considers local social habits is essential to create spaces with identity. For instance, in the Iraqi culture an inner life is encouraged. Therefore, in the MOSUL competition, the transition from private to public spaces was carefully addressed.
- Art reflects local culture, beliefs, and concerns. In the SHELTER competition, the fabrics made by the community was the inspiration of the exterior bamboo claddings used for the shelter. In the MOSUL competition, the geometric

patterns appreciated in local artworks were applied in some urban and architectural decisions. Local art defined the colors used for the buildings in the RESIDE competition.
- Acknowledging the economic activities that sustain a community helps to determine the spaces that should be designed to help its economic growth. In the RESIDE competition, the Koliwada fishing community is the "client" of this proposal; therefore a fish market and jetties were included in the program.

In addition to the design considerations related to site and context, urban features and culture and society, three strategies that led the three competitions' design process: time-based design, dual design and a multiple scales interaction design.

- **A TIME BASED DESIGN** is related to the ability of every structure to change, adapt and grow over time, it is used to give response to physical and social needs of the users.
- **A DUAL DESIGN APPROACH** surpasses the condition of time. It is related to a mixed-use development that works as a social cohesive scenario where multiple activities with overlapping time durations converge in one single space.
- **A MULTIPLE SCALES INTERACTION DESIGN** is the ability to move across the diverse scales involved in a project and determine a connection between them.

A cohesive design in diverse scales able to adapt, change and growth was the core of the design approach for all the three competitions. This concept was applied in the SHELTER competition with a proposal composed by multiple modules that can host diverse uses in a communal space and whose constructive system is based in a folding structure that grows parametrically. In the MOSUL competition, the time-based design strategy and the dual design approach was applied by incorporating transitional shelters in the permanent urban fabric. Incremental housing prototypes and public space with multiple uses were the strategies based on these precepts applied in the RESIDE competition.

CONCLUSION

This thesis defined strategies to address the challenges involved in the design of spaces after three causes of forced migration: natural disaster, conflict and urban development. The methodology applied to develop this research was based in literature review and design proposals that were part of international architectural competitions related to these topics.

Every natural disaster is unique in its complexity, impact, and cultural context. Therefore, a reconstruction approach based on the type of disaster, its aftermath, the features of the site and the culture of the affected community is essential. Due to the need of an immediate response a shelter that can be transported and deployed quickly and effectively is ideal. Therefore structural stability, durability, mobility, autonomy and basic infrastructure must be considered in its design.

Refugee camps have become the protective and safe place that provide shelter, food and health safety to all kinds of survivors and refugees. Due to the complexity of the problems related to this forced migration situation, the presence of refugee camps tends to be longer than expected. Therefore, a design that address this duality and that contemplates the essential needs, civil rights and cultural background of these citizens is mandatory.

Slums are often related to deprivation and socio-spatial exclusion.

Interdisciplinary actions that focus on physical, social, economic, organizational, and environmental improvements within these neighborhoods are encouraged. This transformation process should start in public spaces that have the potential to integrate the city, promote accessibility and establish a new or positive sense of place. In regard to the dwellings' design it is necessary to study the morphology and typology of the place and to contemplate incremental housing prototypes that respond to the economic constraints and the future needs of the dwellers.

Design considerations related to site and context, urban features and culture and society are essential to give an architectural response that considers the complexity and cultural context of forced migration scenarios. A time-based design, a dual design approach and a multiple scales interaction design are the strategies found essential to address the challenges involve in the design of spaces after forced migration as they promote adaptability to physical and social dimensions in terms of time and space.

Finally, it is critical to understand that the success of architectural responses to forced migration scenarios is aligned with considering the specific features of the affected community, the development of diverse strategies and an active participation of diverse actors in the different stages of the reconstruction.

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Appendix

APPENDIX 01
GLOBAL ORGANIZATION PROGRAMS AND THEIR ROLES

SECTOR OR AREA OF ACTIVITY		ACRONYM	ORGANIZATION NAME
Camp Coordination / Management	Internal Displaced Person (from conflict)	UNHCR	United Nations High Commissioner for Refugees
	Disaster situations	IOM	International Organization for Migration
Early Recovery		UNDP	United Nations Office for Disaster Risk Reduction
Emergency Shelter	Internal Displaced Person (from conflict)	UNHCR	
	Disaster situations	IFRC	International Federation of Red Cross and Red Crescent Societies
Emergency Telecommunications		UN OCHA	Office for the Coordination of Humanitarian Affairs
Health		WHO	World Health Organization
		CRED	Centre for Research on the Epidemiology of Disasters
Logistics		WFP	World Food Programme
Nutrition		UNICEF	United Nations International Children's Emergency Fund
Protection	Internal Displaced Person (from conflict)	UNHCR	
	Disasters/civilians affected by conflict	UNCHR	
	(other than IDPs)	OHCHR	Office of the High Commissioner for Human Rights
Housing and community reconstruction		UN OCHA	
		CWGER	Cluster Working Group on Early Recovery
International Strategy for Disaster Reduction		UNISDR	United Nations Development Programme

COMPETITIONS SUMMARY MATRIX

GENERAL DETAILS	COMPETITION 1 SHELTER 48:00:00	COMPETITION 2 MOSUL POSTWAR CAMP	COMPETITION 2 RESIDE
Background	Ecuador was hit by a 7.8 Mw. Earthquake on April 16, 2016. Widespread damage was mainly caused across the northern part of the coastal region of the country. Chamanga, Pedernales, Jama, Portoviejo, and Manta accounted the greatest percent of casualties and losses. According to the report issued by the Department of National Risk there were 661 people were killed, 6 274 injured and 28 678 displaced.	On June 10, 2014, Islamic State took over the city of Mosul. Om October 16, 2016, after more than two years of ISIL occupation, the city has been recaptured. Life is beginning to sprout again in its streets and neighborhoods with the return of thousands of former inhabitants who are becoming refugees in their own city.	Mumbai is a city where land is regarded as the most precious resource. Therefore it may only be a matter of time before Worli Koliwada, a traditional fishing village on central Mumbai's western coast, is replaced by more profitable ventures. In fact, since 2015, the Slum Rehabilitation Authority wants to declare parts of it as a slum, but residents have objected to the proposal. They want development, and not slum rehabilitation.
Challenges	• A concept of shelter in the immediate aftermath of natural disaster. • Emergency life support system to be transposrted and deployed rapidly after a natural disaster.	• The project as a meeting point of families that allows the emerge of a new society. • Design two different areas: Urgent Humanitarian Aid (temporary) and the City Reintegration Zone (permanent)	• Design for both the indigenous fishing community and for an affluent group. • Shortage of public open space. • Threats to the historic and urban fabric. • Annual monsoon flooding and rising level.
Location	Chamanga, Ecuador	Mosul, Iraq	Worli Koliwada, Mumbai, India
Human settlement type	Rural	Urban	Urban
Scale	Shelter prototype / Community	Shelter / City	Dwelling unit /Neighborhood
Project condition of permanence	Temporal / Transitional	Temporal and permanent	Permanent