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Urban Systems of the Refugee Camp

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Content

Introduction

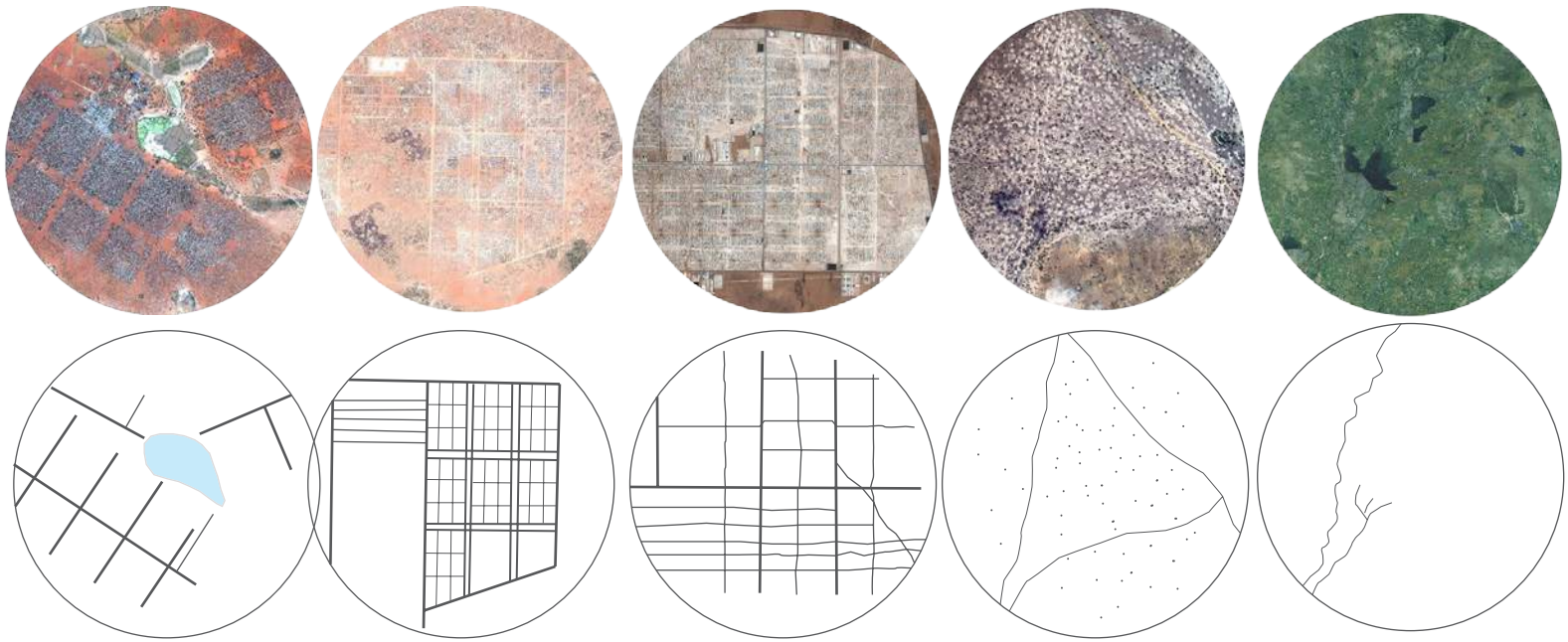
Many societies confront the challenges of balancing the needs of the individual with that of the collective. The various scales seen in cities, from the urban to the neighborhood, indicate the attempts to negotiate these differences. There is often a struggling relationship between what the individual thinks they deserve, and what the city is responsible for provide. In many cases the formation of communities allows residents to feel more connected with their surroundings. These attachments help to ground a person in a stable place. As they relate to the buildings, businesses, people, ect. Of their surrounding area they feel more at home, naturally gravitating towards the permanent. The battle between permanent and impermanent can be seen in any city or collection of individuals.

These three issues (scale, community forming, and temporarily) indicate some of the largest concerns any city or city dweller faces. An analysis of refugee camps and the complex information used to form them reveals an extreme example of what happens when these three concerns are at polar opposite ends of the spectrum. Refugee camps act as extreme cities where the issues of scale, permanence verses temporarily, and community forming can be confronted. There highly charged political nature provides the ground work for operating within a tight system. Two styles begin to emerge, the rigidly controlled, and the ad hoc organization.

The refugee crisis is on the forefront of international development. The combination of natural disasters, and armed conflict have displaced nearly 50 million people[1], roughly the population of the United Kingdom. Larger refugee camps are comparable in population to Syracuse, with upper populations of around 138 thousand. While not all reside within refugee camps, the settlement prove the most difficult to deal with. Huge influxes of people, sometimes thousands per day[2], make it impossible for aid organizations to maintain order.

There are countless handbooks, manuals, papers, ect. on the formation and maintenance of these camps. Contributing groups include the UN, USA, and non-governmental organizations (NGO's) such as the Red Cross. The information in these handbooks lays out a system that is filled with contradicting instructions, vague references, and strict limitations. In an attempt to accommodate the host governments and the humanitarian needs they have created a document with very little informed design. Although muddled, the information within the manuals can be subcategorized into the three categories that contribute to a city. An analysis of the successes and failures of various case studies will reveille the pit falls and successes of their intentions.

1 Foy, H. UNHCR refugee statistics



Hagadera Ifo 2 West Zaatari Panian Urfa

Various examples of refugee camps can demonstrate the sporadic approach to their design. Urban planning can be anywhere from military grid to randomly scattered shelters. Individual homes differ greatly in their adaptability and alteration. The balance between an individual's desire to create a place of their own, and the government's intention to maintain order and security, can be seen in every day decisions in the camps. In the following section I will bring up the key points found in the formation of a refugee city. Each of these issues is confronted and dealt with to various degrees of success.

Upon completion of my research I will design a system that allows the flexibility needed by the people as well as the control the government and NGO's are responsible for providing. I will focus on the way playing with the relevant scale can help to bridge the gap between individual and group. Special configuration is a key component in forming communal spaces. The integration of these spaces on every scale is fundamental to achieving success. Issues of permanence can be addressed though alternative building methodologies, and the lessons learned from indigenous people.

Population Data on Largest Refugee Camps[3]

	City Name	Host Country	Origin Country	Population
1	Hagadera	Kenya	Somalia	138,102
2	Dagahaley	Kenya	Somalia	120,017
3	Ifo 2 West	Kenya	Somalia	116,440
4	Ifo	Kenya	Somalia	96,372
5	Zaatari	Jordan	Syrian Arab Republic	79,180
6	Nyarugusu	United Rep. of Tanzania	Democratic Rep. of the Congo	67,817
7	Tamil Nadu	India	Sri Lanka	67,165
8	Urfa	Turkey	Syrian Arab Rep.	66,388
9	Nakivale	Uganda	Democratic Rep. of the Congo	61,385
10	Panian	Pakistan	Afghanistan	56,820
11	Old Sham-shatoo	Pakistan	Afghanistan	53,573

1 Maps, E. Fiftey most populous Refugee Camps

Site Introdution

The Zaatari Refugee Camp located in Jordan, on the boarder of Syria, will be the site under investigation. The Current population is around 80000 people[1], most of which have come from Syrian Cities that have been demolished in the civil war. It was officially formed in 2012 and at its largest size was around 200,000 people, with 500-1000 new arrivals every day[2]. The massive expansion has lead to major confrontations with the Jordanian government over resources and the evolving permanence of the camp.

People living in the camps were mostly from the Da'ara Governorate.[3] Before arriving in the desert waist land most of them enjoyed a relatively high standard of living in semi-urban areas. Kilian Kelinschmidt, the manager of the UN's Zaatari Camp describes the population as "independent, and highly entrepreneurial." They have taken ownership of their surrounding by setting up shopping districts, camp Elyseese street, and settling in areas with similar cultural or geographic ties. This sophisticated population could prove to be an opportunity to introduce alternative building typologies that are influenced by local building typologies.

1 UNHCR. Refugee Response
2 Chulov, M. Zaatari camp
3 Edstram, M. Zaatari360

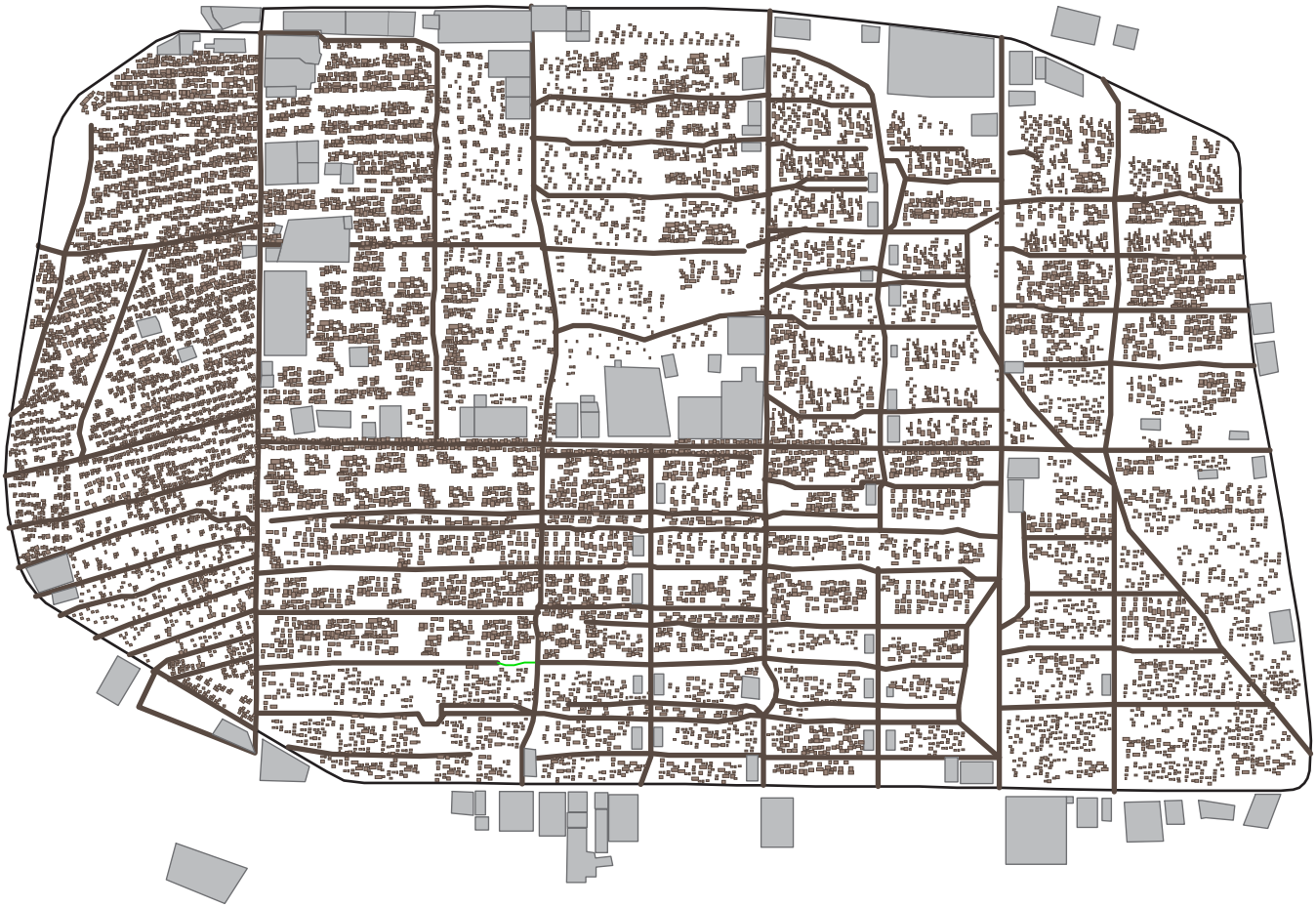
Man layes outside home in Zaatari, Jordan[1]

Refugees in Zaatari have taped into the local electricity grid.[2]

The location of Zaatari is an unforgiving expanse of desert that is only a few Kilometers away from the city of Daraa, Syria were 90% of the population originates from[1]. Shelling can be heard throughout the camp from the war torn region, and buildings on the north side of the site have been known to shake with the impact of the nearby explosives[2]. The climate of the region is just as unforgiving. Summer temperatures can exceed 100 degrees Fahrenheit, and the camp in frequently covered in snow in the winter[3].

Current building typologies, as well as infrastructural layout are insensitive at best. Throughout this book I will be looking at aspects of the site in relationship to the criteria laid out in the organizational handbooks, and relevant case studies. The solutions, and innovations found in precedent analysis will dictate a more informed design that help to negotiate the difference between the harsh political and physical environment of the Zaatari Refugee camp.

1 Edstram, M. Zaatari360
2 Chulov, M. Zaatari camp
3 Edstram, M. Zaatari360



Relationship Between Urban and Individual

A refugee camp is a combination of the needs of the individual, and the demands of a complex urban network. Like any other city it must negotiate the changes in different scales that takes place over time. While aid manuals will frequently be filled with information about ways to layout camps as well as requirements and suggestions for shelters, the two demands are rarely integrated. There is a tendency to view the two scales as separate issues, eliminating potential design solutions that could be found between these different scales.

Camps are organized by categorizing people by the number in their group and addressing them as separate entities. A family is considered one to six people. A community is sixteen families[1]. The communities are then arranged to form the urban network found in refugee camps. In this way they are similar to neighborhoods, or boroughs within a larger city[2]. The communities are often based upon cultural or familiar ties. People from similar regions, religions, ethnic backgrounds, ect will come together[3]. Aid organizations stress the importance of allowing these cultural ties to influence spatial help to reduce stress and allow people to feel more connected to the land they have been forces to abandon.

1 Corsellis, T, Transitional Settlement
2 NRC, Camp Management Toolkit
3 Greane, P, The Sphere Project

In an attempt to facilitate social communities a form of urban planning has been put into place called cluster planning[1]. The organization will arrange infrastructural elements, such as roads and possible electricity, like a tree branch spreading out from a central location. Certain facilities will be provided at the central location (offices, healthcare, warehouses, market, community centers), while others will be decentralized throughout the camp (water, latrines, bathing, garbage, education).[2] Cluster planning gives occupants more freedom and responsibility when it comes to their individual shelter. In addition cluster planning helps avoid some of the adverse environmental effects that result from the grid planning approach.

1 Corsellis, T, Transitional Settlement
2 Corsellis, T, Transitional Settlement

Another alternative to urban planning is the grid. In the case of camps that are formed quickly as a result of a natural or civil disaster this is the most utilized approach. It is quick to layout and easy to maintain accountability, on the part of the organization[1]. Although recent publications have indicated that it isn't the preferred method, more often than not it is the one deployed. There are frequent problems associated with the grid planning approach. For example its' rigid structure creates military-like camps that decrease cultural connection among occupants[2]. While the cluster plan will decease environmental effects, the straight lines of the grid plan often act as wind funnels blow up dirt and increasing erosion of local resources. Cluster planning allows camps to be folded and integrated with the topography as opposed to the gird which is difficult to negotiate around local contexts. The organic nature of the cluster plan allows a more additive approach to the refugee camp. The roads form veins that can expand and grow with the camp as needed.

1 Corsellis, T, Transitional Settlement
2 Corsellis, T, Transitional Settlement

Three primary community arrangements are proposed in various guides to refugee design. The staggered square plan provides road hierarchy to allow a more stream line approach to the delivery of goods within the community[1]. Although it can lead to the creation of a grided urban network, the possibility to stagger the plans so roads jog throughout can reduce the risk of wind tunnels. The hallow square is the most effective way to maintain the unity of individual communities. The placement of the water source, which can be a point of major contention, in the center of a communal square ensures that communities use the services that are assigned to them. Public and private sides of the street ensure residents have places to gather that are not in the way of traffic[2]. The community Road Plan creates open squares along roadways, similar to Italian piazzas. While this arrangement allows for more open communal space, the placement of water along the transportation route makes it impossible to maintain control.

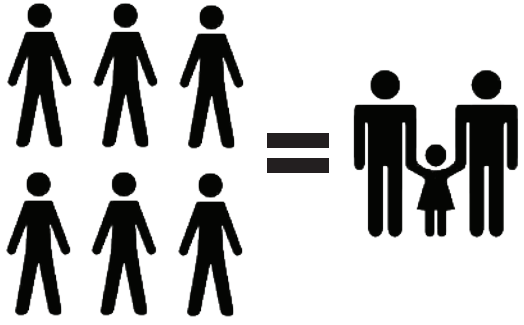
1 Corsellis, T, Transitional Settlement
2 Corsellis, T, Transitional Settlement

On the smaller scale of urban design, is the approach to individual settlement.[1] Although some handbooks suggest you start with the needs of the individual and expand to the urban, the lack of specific designs suggest that is often isn't the case.[2] While the urban design sections depict multiple graphics and suggestions for layouts, information related to the individual is often vague and non-committal. Some specifics included numbers such as the individual requirement for covered space (3.5 m2), and the size of a family plot of land (200m2). These can differ depending on the climatic conditions of the site. In areas of cold weather people are given more space (around 4.5-5.5 m2) due to the large amounts of time people will spend indoors.[3]

1 UNHCR, Handbook for Emergencies
2 NCR, Camp Management Toolkit
3 OCHA, Tents: A Guide

The functionality of individual shelters as living spaces can be called into question. Issues of heating, fire safety, and programing of internal spaces can become complicated given the limited amount of space. In addition to the more apparent issues of fire safety, and the dangers of catching shelters on fire, there are health and environmental risks. In colder climates where people will often spend long amounts of time inside poorly ventilated structures exposer to smoke can cause damage to the lungs and create chronic illness[1]. The consumption of fire wood can lead to tension between the host country and the refugees if they begin to destroy local forest and resources. The option to truck in firewood proves its own complications, such as cost and restriction due to inclement weather. The arrangement of spaces within shelters can prove another major conflict zone. While temporary divisions within buildings can allow various programmatic functions, the close relationship of family members can cause tension. Cultural norms of occupation are often ignored in order to provide housing for all effected families. The division of programmatic spaces within the small individual shelters is nearly impossible. As a results people often sleep in the same area where they cook, store goods, and sit.[2]

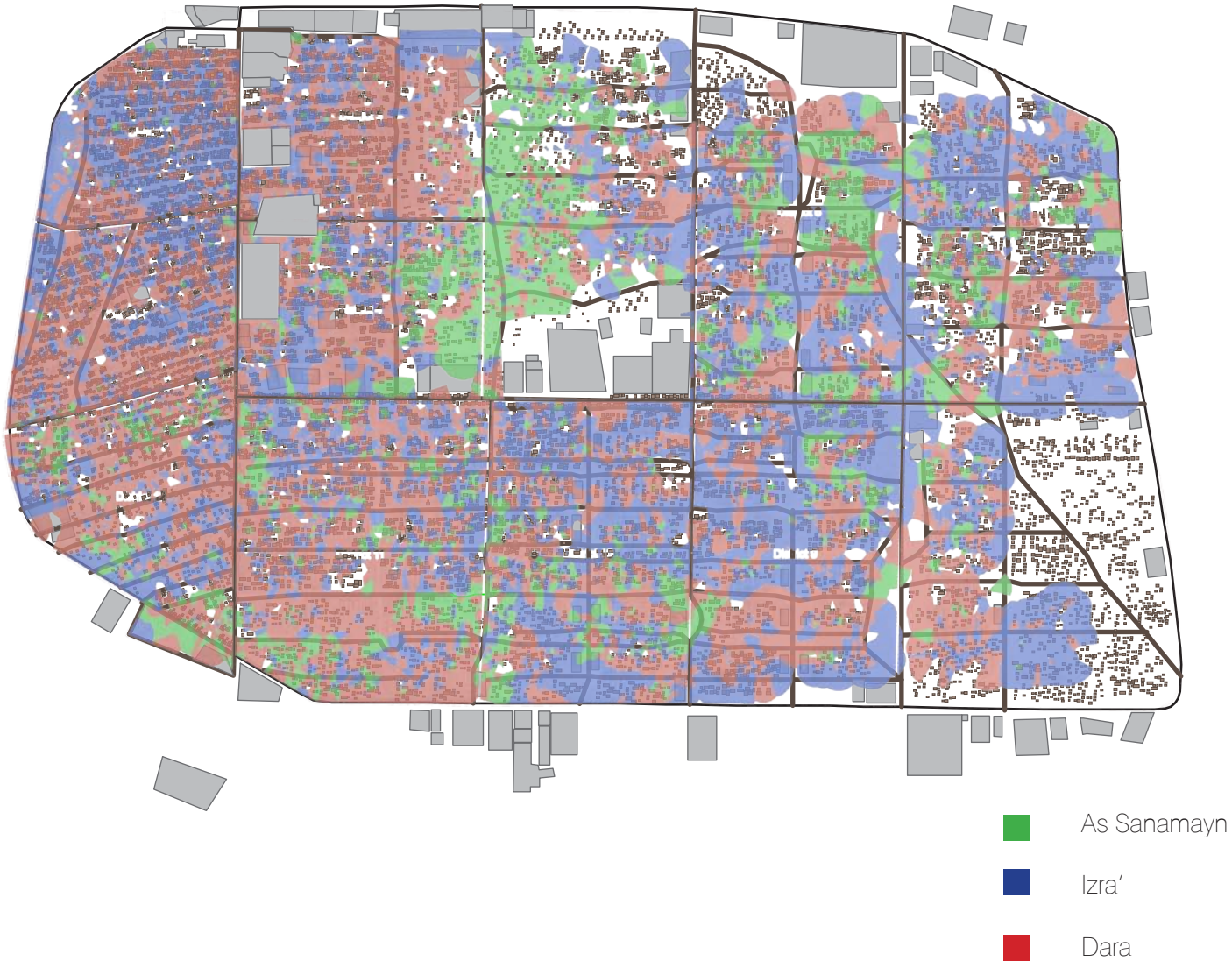
1 OCHA, Tents: A Guide
2 UNHCR, Handbook for Emergencies

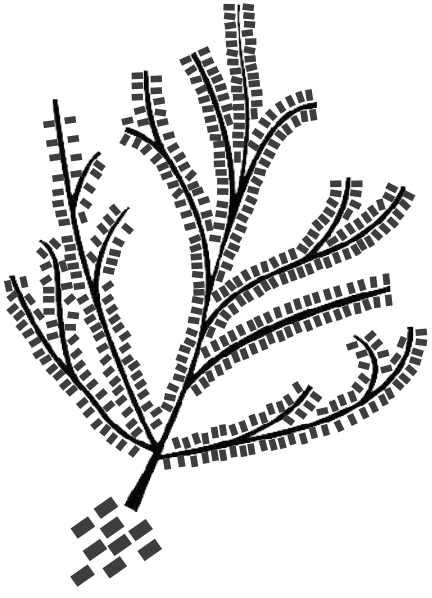


In the Zaatari Camp people will identify with one of three major cultural groups based off of geographic location, As Sanamayn, Izra', and Dara[1]. As can be seen in the demographic map to the right people will try to move into an area that identifies with their particular culture. In some cases this may be an old neighbor, but it may also be a stranger that lived in the same city. This quest to connect with others is fundamental to the population but largely ignored by the organization. The introduction of informal public gathering spaces would allow more opportunity for connection.

1 UNHCR. Refugee Response

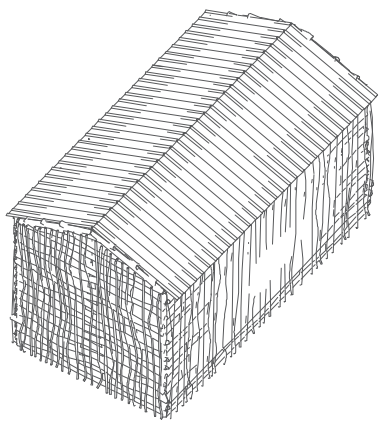
Zaatari Population Origin



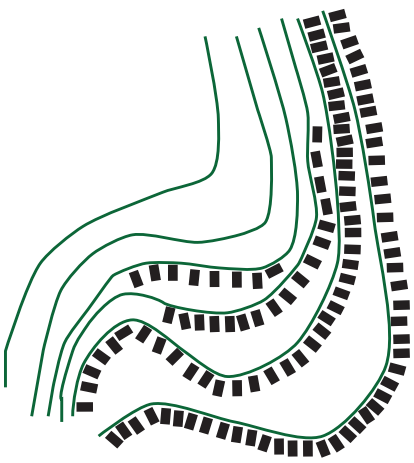


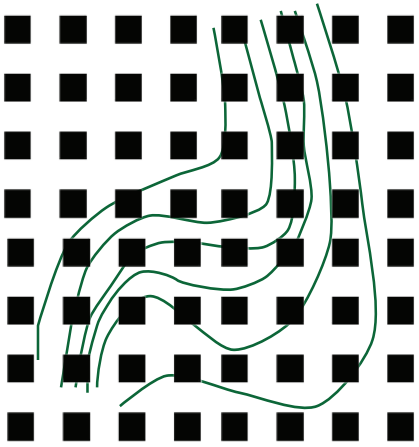
The Mae La Refugee Camp in Cambodia[1] is a good case study of the initiatives of cluster planning. The buildings wind themselves around the tree lines and elevation changes of the mountains they are settled in. This gives is more of the appearance of a rural village then a refugee camp. As a result of this form of planning the occupant have taken ownership of their surroundings and turned the tent shelters they were once provided with into more permanent solutions. They used local building materials such as sticks and mud to reinforce their structures.

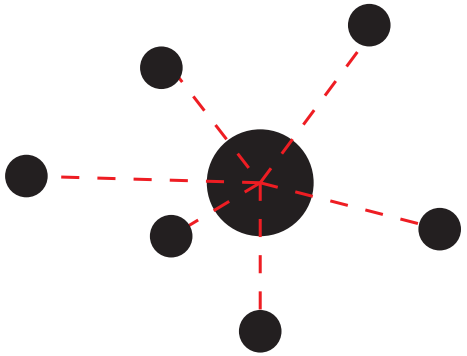
1 IFRC, Shelter Projects 2009



Mae La Refugee Camp, Cambodia

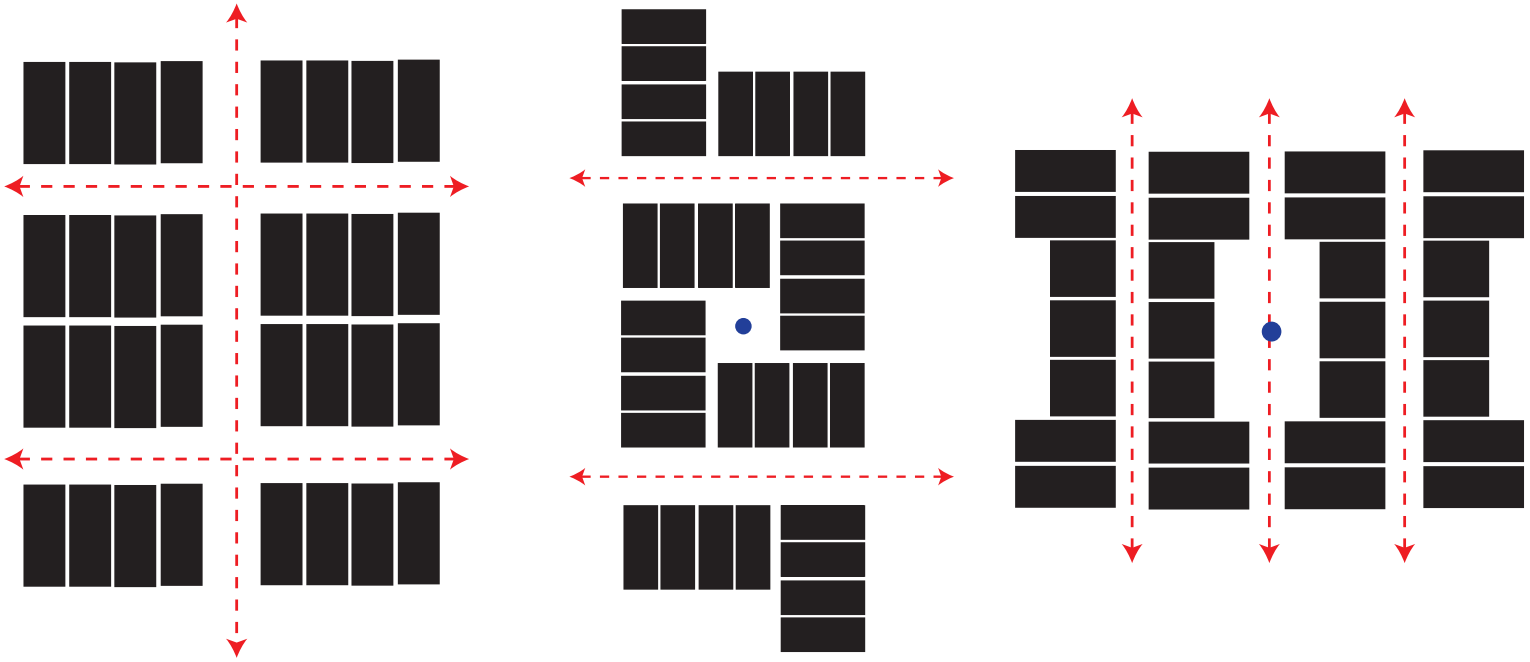






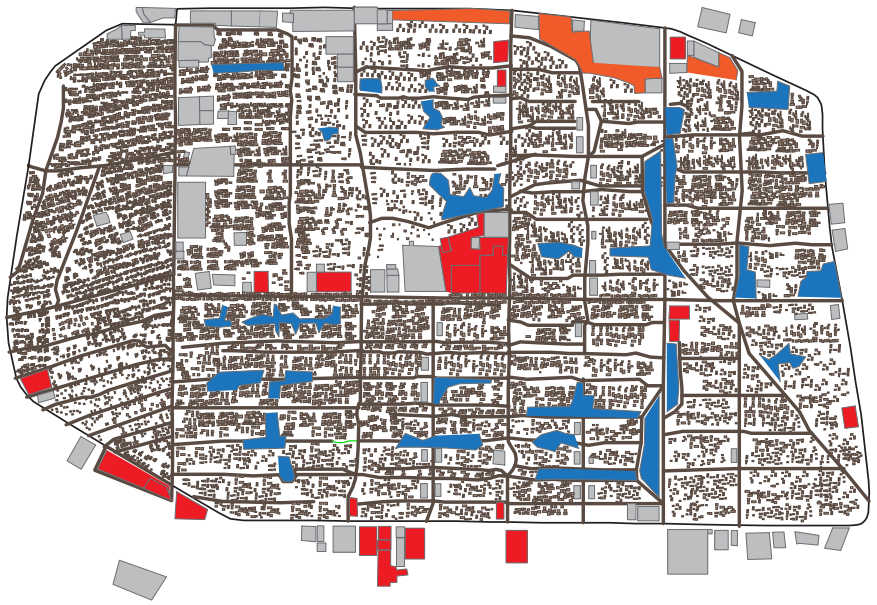
Infrastructural planning in the Zaatari is a blend of grid and cluster planning. The original areas of the camp, those located in the North West, were originally laid out using the cluster plan.[1] There are fewer organized roads in this area, and settlements are closely packed. As the camp was forced to grown to the east and south the rapid population growth forced camp planners to switch to the grid in order to arrange people quickly and efficiently. In this case grid planning had some positive effects. The main street, Camp Elyseese, runs through the middle of Zaatari from east to west.2 The streets long unimpeded nature has created an area that is ripe with commerce and trade, acting as the central business district in the camp.

1 Chulov, M. Zaatari Camp
2 Edstram, M. Zaatari 360



Staggered square planning is the closest to that experienced in Zaatari. Although the idealized version of this sounds effective, in reality to provides little opportunity for community design and instead creates isolating spaces between neighbors. Open space at the center of camp is more functional, often grouped around clinics, schools, or community centers[1]. The further from the epicenter one gets, the more ambiguous the public space becomes. Areas at the perimeter have no gathering space to speak of. The best alternative are the large expanses of open sand that stretch from one shelter to another[2]. The community space would be more effective if addressed in a similarly manner to those found in cities, large programmed space in the center with small informal, but planned, areas scattered around the whole camp.

1 Edstram, M. Zaatari 360
2 Edstram, M. Zaatari 360

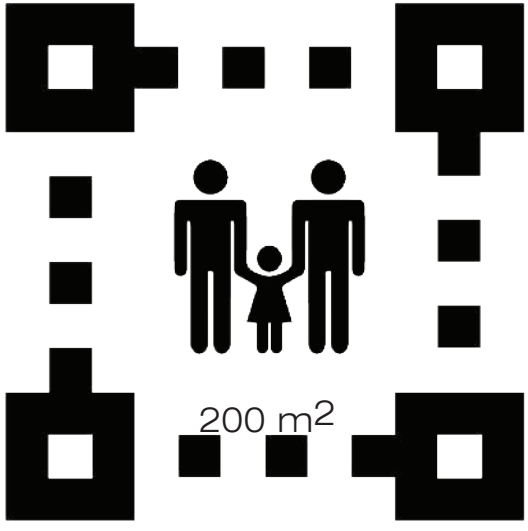


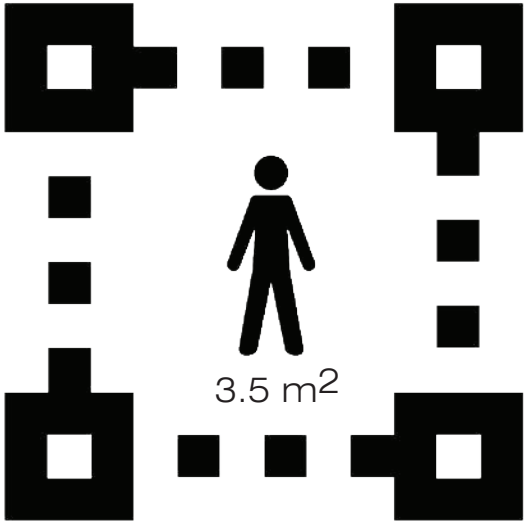
Public Space

Programed

Industrial

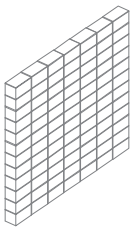
Informal

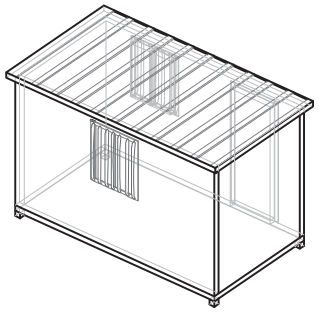


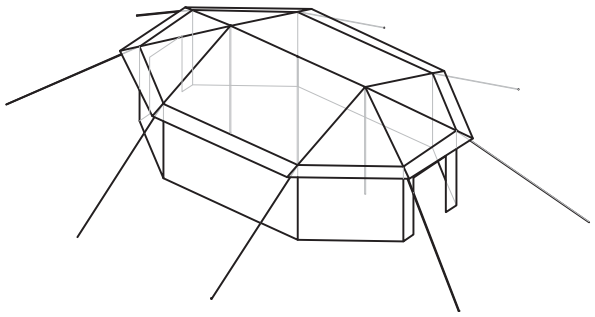


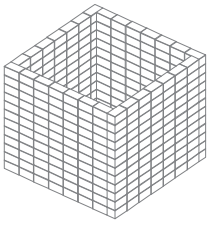
Within the Zaatari camp setting there are three primary forms of individual shelter. The modal unit, the tent, and the concrete block wall[1]. When a family arrives in the camp they are distributed either the unit or the tent. In most cases the average number of people living in one unit is six people. As the occupants live there longer they will begin adding the structure by either creating additional rooms out of concrete walls, or combining units with other family units to form familiar complexes. This ad hoc approach to building expansion will be a key component in my proposed design. The combination of different construction methods, such as prefab, kit of parts, and normative construction provide a primary indication of adaptability.

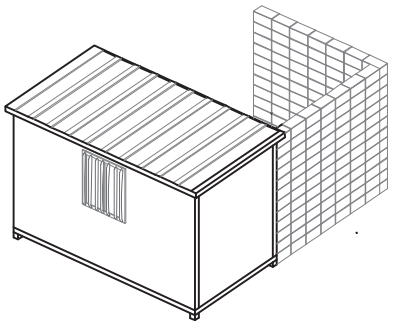
1 Edstram, M. Zaatari 360

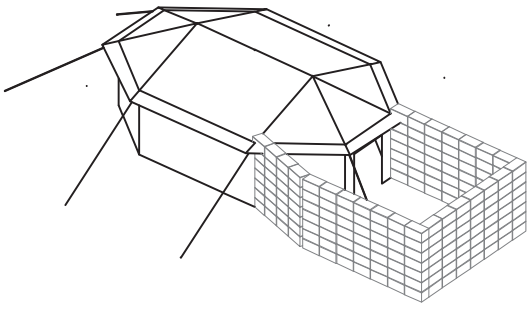


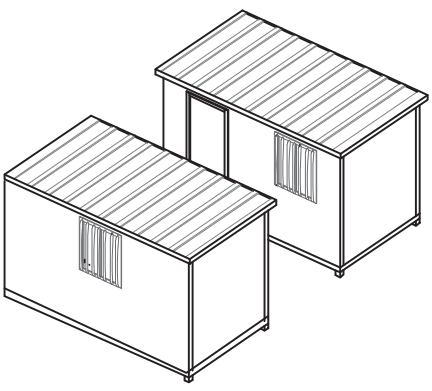


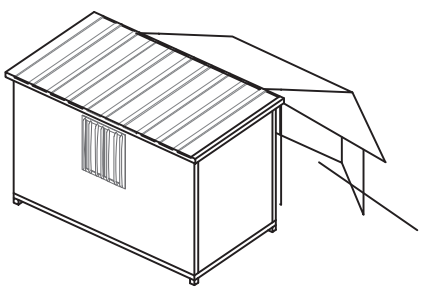


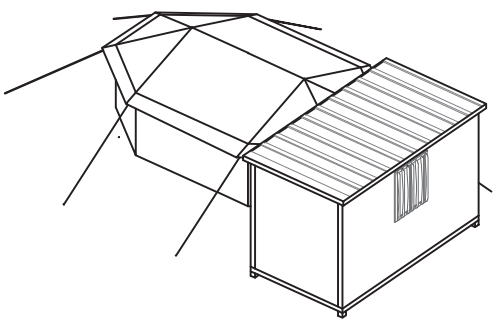


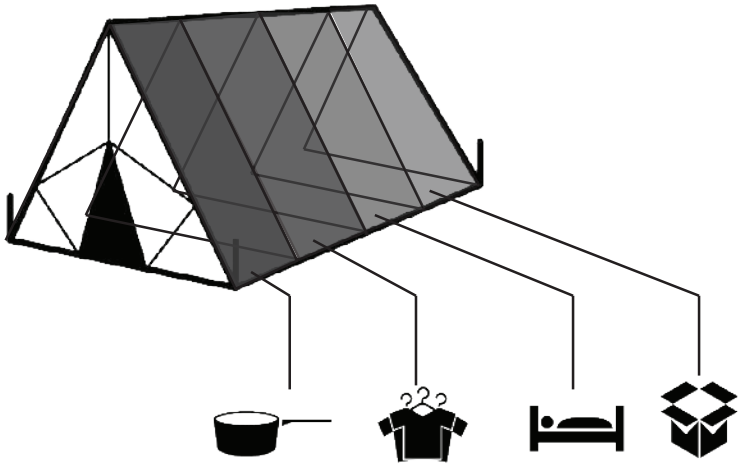


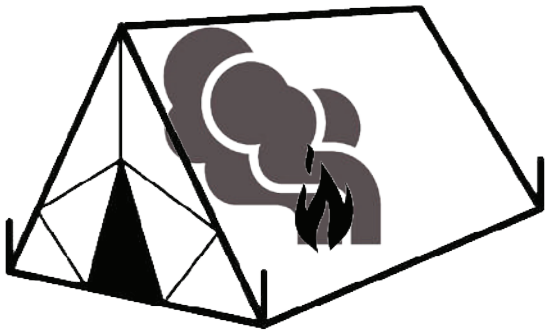






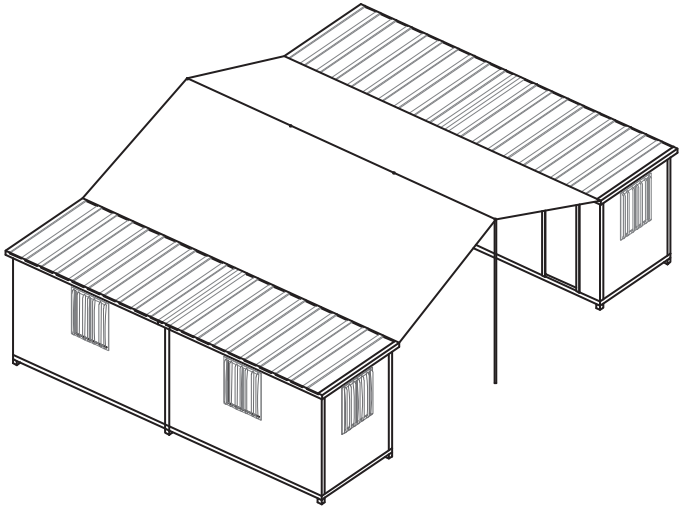


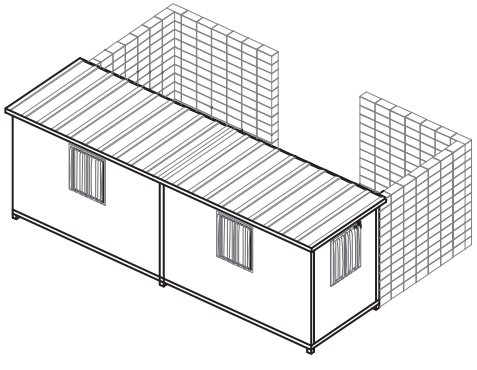


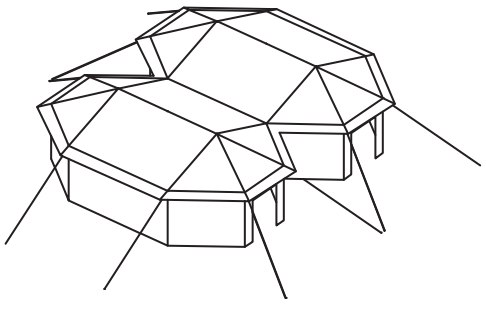


The addition of rooms or creation of covered exterior spaces is a common solution to the lack of interior space. When the climate allows, cooking outside results in better air quality. During the summer months the shelters are stifling hot and most occupants will construct shaded areas to escape the sun's rays[1]. These constructions are encouraged by the UNHCR and NGO's that run the camp, as they help improve the health of the occupants. [2]

1 Edstram, M. Zaatari 360
2 UNHCR, Refugee Response







Community Forming

The need to feel connected to other people is one of the primary psychological concerns in refugee camps. The stresses upon displaced people can often lead them to isolation. The design of the urban network must facilitate communal connections in order to encourage people to take ownership of their surroundings. By including local people in the design process and looking at local building typologies, camps can become more relevant to the populations that live there. As people take more ownership of their surroundings and become more invested in their community, they stop seeing their situation as temporary often clashing with local government who seek to discourage the permanent settlements of foreign people.

Camps are often similar in size to small cities and function similarly on the urban scale. Although they may be lacking certain amenities such as neighborhoods, shopping districts, and infrastructure, these areas are classified as cities. Some camps, such as Zaatari in Jordan, even have amenities such as washing machines and running water[1]. When designing camps these facts are often ignored and the realities that allow cities to grow are ignored. Growth is one of the most fundamentally ignored concerns. Rapid construction often leads to a lack of communal space in urban design. This eliminates the space cities normally use to adjust to increasin population. As a result, a form of urban sprawl is often created where camps become increasing less organized as they grow outward and aid organizations lose spatial control. This can lead to areas that are without basic services such as water and sanitation facilities[2]. By including spaces within the design where occupants can feel responsible of their landscape, more control can be exercised to ensure safety to the inhabitants.

1 Kimmelman, M, Refugee Camp for Syrians
2 Corsellis, T, Transitional Settlement

The physical act of constructing the camp acts as a way to bring refugees communities together. Self-built and community led initiatives are often preferred because they encourage ownership of the occupants surroundings[1]. The designs of structures tend to be simpler with more labor-intensive building methods. Prefabricated structures have proved ineffective in most situations, due to their high cost, and lack of social context[2]. Tents are often distributed as initial shelter in cases where large influxes of people are rendered displaced in a short amount of time. These are relatively light weight and are kept at a low cost due to their construction in areas of the Middle East[3]. They are a quick soultion to the housing crisis that camps experience. Extended families will often join together their tents in order to provide a larger living space that can be divided and organized by gender or age[4].

Around seventy percent of refugees are women and children[5]. Due to the limits on workforce, aid organizations suggest that any shelter solution be able to be constructed by a team of two in a day. Women are often viewed as the primary individual in charge of household construction and maintenance[6]. In their homeland they were familiar with the local resources and knew how to construct shelters. In my proposal local people and building typologies should be consulted. Simple construction is preferable due to time, resource, and monetary restrictions.

1 UNHCR, Handbook for Emergencies
2 Greane, P, The Sphere Project
3 OCHA, Tents: A Guide
4 OCHA, Tents: A Guide
5 NCR, Camp Management Toolkit
6 NCR, Camp Management Toolkit

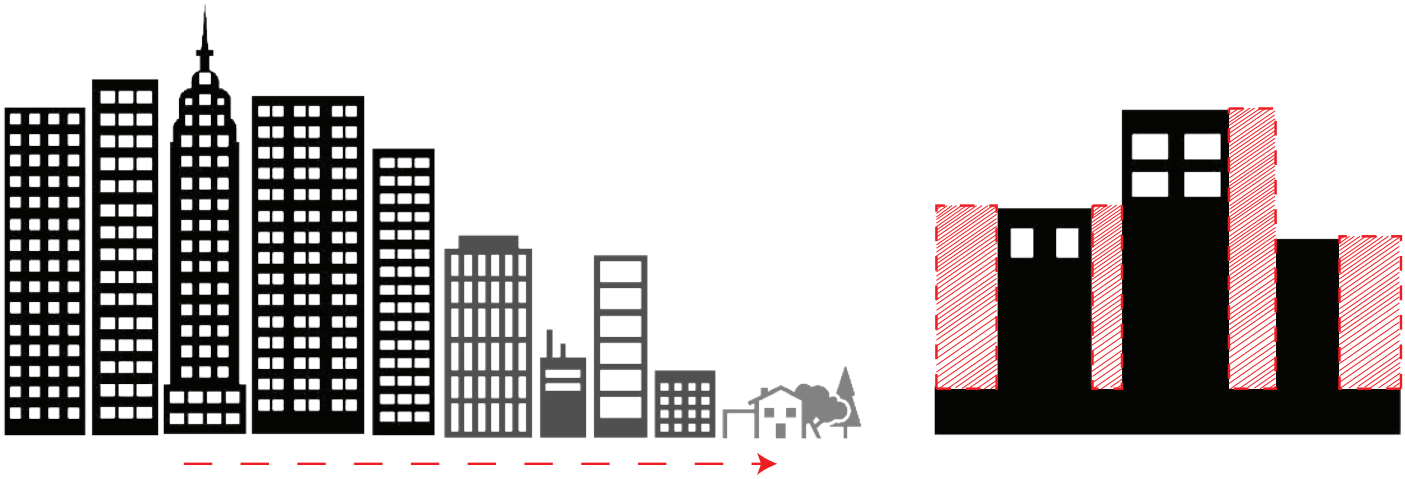
The incorporation of Cultural influence is often suggested by aid organizations. Local building typologies often indicate the best solution cllimatically climate. Materials, forms, and orientation can all be derived from the existing structures. The performance advantages with to local building design combined with the cultural familiarity occupants have can help make the camps far more in-habitable. A large portion of temporary housing are organized and run by external organizations that are unfamiliar with local construction customs. They will often fail to see the organization that the occupants have created. A situation that may appear chaotic to an outside eye may in fact be the best solution.

Corruption and the balancing of power relationships can often be a difficulty. Although there is a limit on how architecture can aid such situations, any proposed solutions should not encourage these acts. These issues are multilayered and complex, and must be addressed to some degree.Simple solutions such as divisions within individual shelters can alleviate the tension within a household where domestic abuse can be common. Aid organizations have classifications of at risk groups that are given special attention to make sure their voice is heard. Children, the physically handicapped, and women are among the many in this group[1]. The way in which shelters are distributed has also lead to a system where girls are sold into early marriages in order to increase the size of a person's shelter. The size of a standard tent is determined by the number of family members that occupy it.

1 Greane, P, The Sphere Project

The interiors of shelters should be given a high degree of adaptability. The interiors should be free of obstacles such as tent poles, so as to facilitate the rearrangement of programs within[1]. New tents have recently been implemented that included a division flap in the middle[2]. This allows families to separate living from sleeping spaces, kids from parents, or male from female. Interior spatial adaptability can play a major role in maintaining peace within families. Privacy is also a key component in making sure all members of the family feel safe and comfortable in their environment.

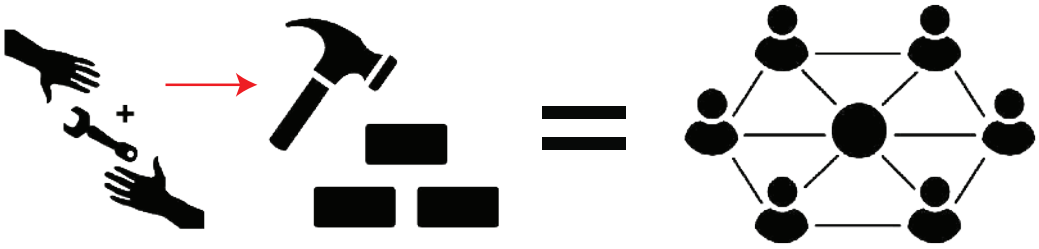
1 OCHA, Tents: A Guide
2 OCHA, Tents: A Guide

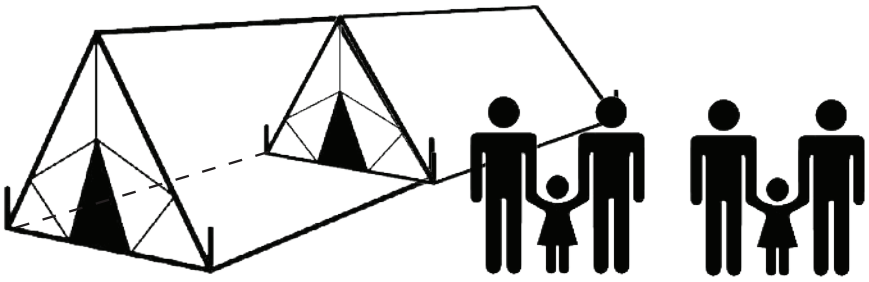


The Quinta Monroy Housing project located in Iquique, Chile and designed by ELEMENTAL is a good example of a project that adjust for urban sprawl[1]. Each unit is a three story structure that has the capacity to be added onto on the right and left. As the occupants need more space they can build their own additions. The programing of open space means that as the population grows organization is maintained rather. It also gives occupants the feeling of personal ownership so they are more likely to keep their home in good repair, and watch over the public square located in front of their apartment.

1 Sinclaire, Design like you give a damn

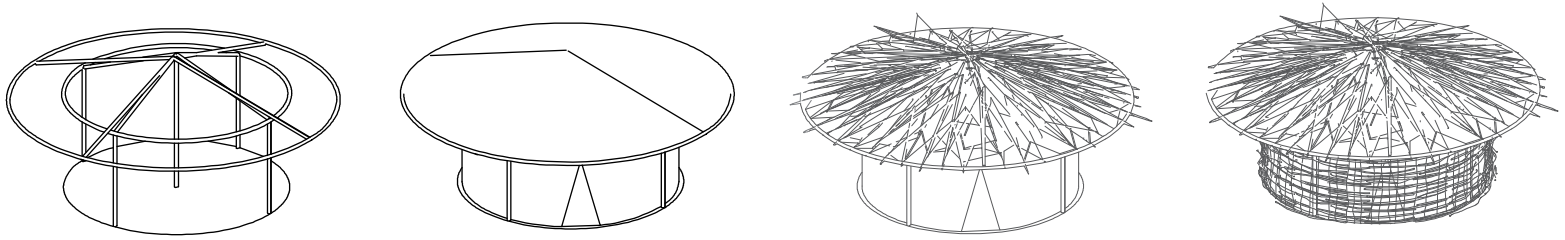
Quninta Monroy Housing Project
Iquique, Chilie
ELEMENTAL

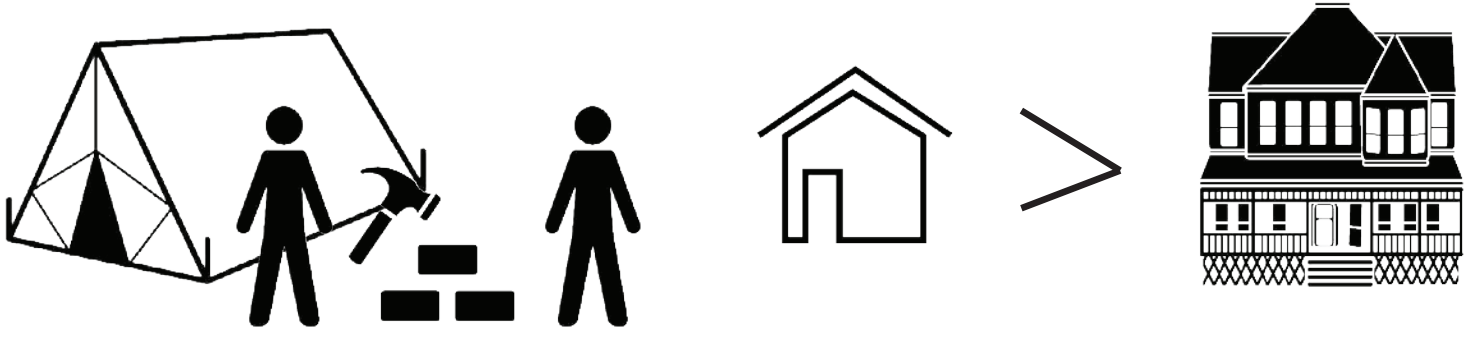




As occupants begin to identify with the shelter they are living in they will make alterations. The process of contrasting a temporary shelter, and its subsequent development into a permanent structure is normally performed in the same order. The structural support is put into place first, often made of plastic piping or locally available wood[1]. A canvas or plastic tarp structure is attached next. This will later provide a water proof barrier to the permanent additions. The roof and floor are the most essential elements of any structure so they are often the next repaired. The final step is to infill the walls with either woven wooden sticks or mud.

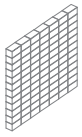
1 IFRC, Shelter Projects 2009

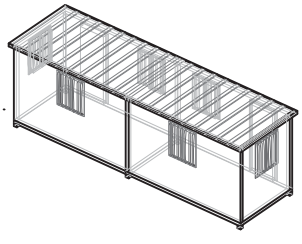


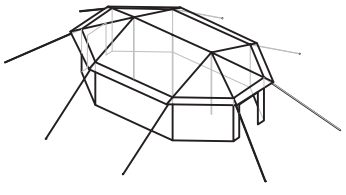


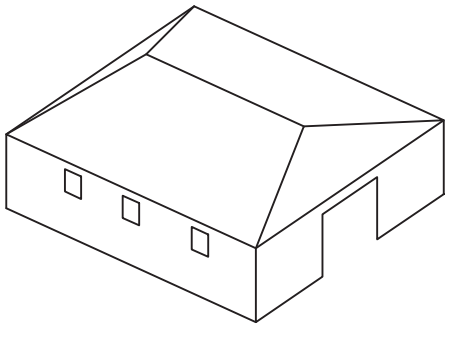
There are eight primary structure types found in the Zaatari camp[1]. They include shelter typologies, offices, clinics, ad hoc additions, and storage areas. In most cases they have little relevance to local building typologies. Occupants will often combine or adjust their buildings to better deal with the climate of the region. A better solution would be to look at the architecture of the region to discern a better initial shelter. For example, mud walls which are often found in the areas as they act as thermal conductors during the day, and insulators at night. My proposal include the lessons learned from local architectural typologies to construct a more comfortable and relevant solution.

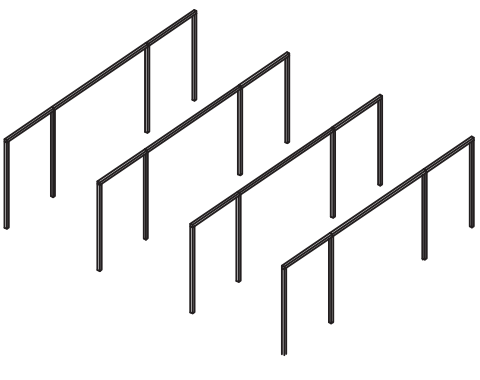
1 Edstram, M. Zaatari 360

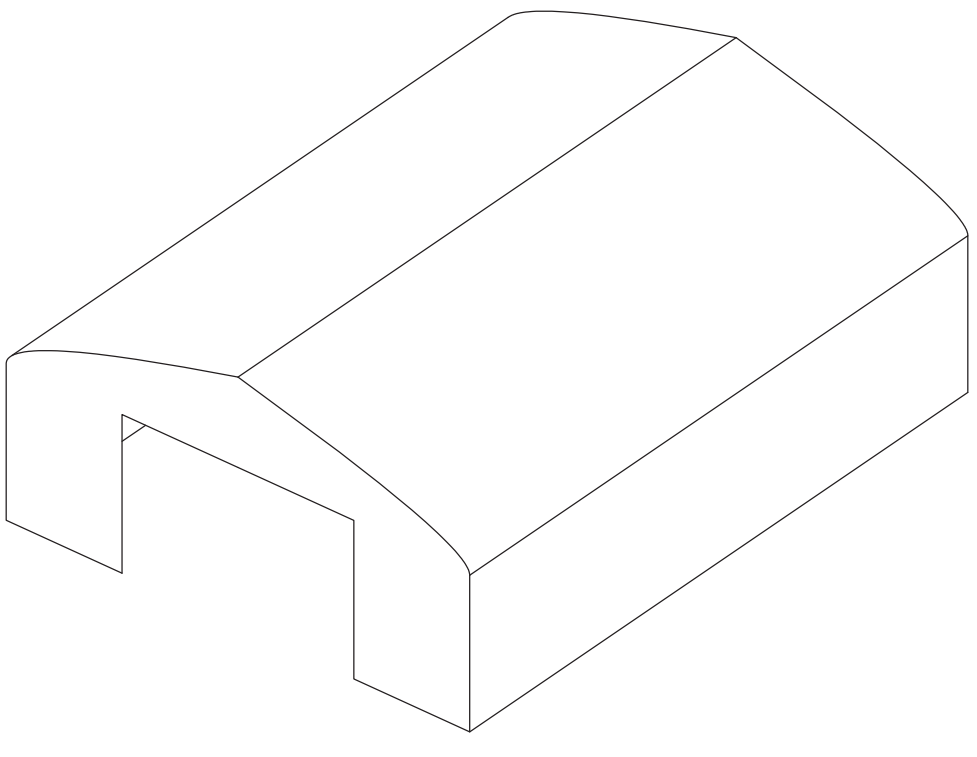


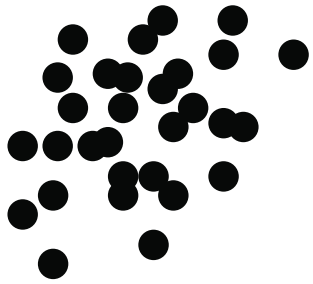






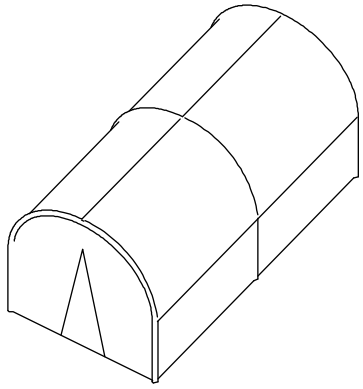


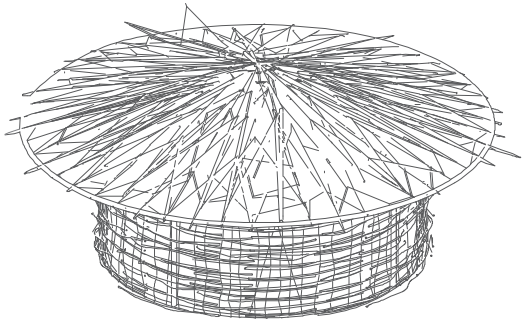


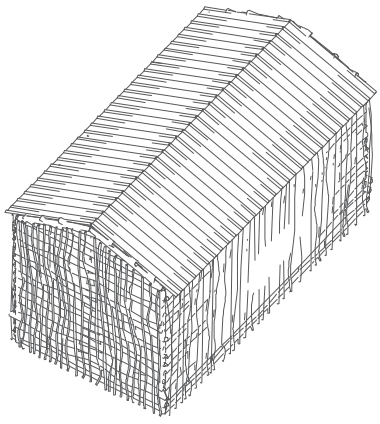


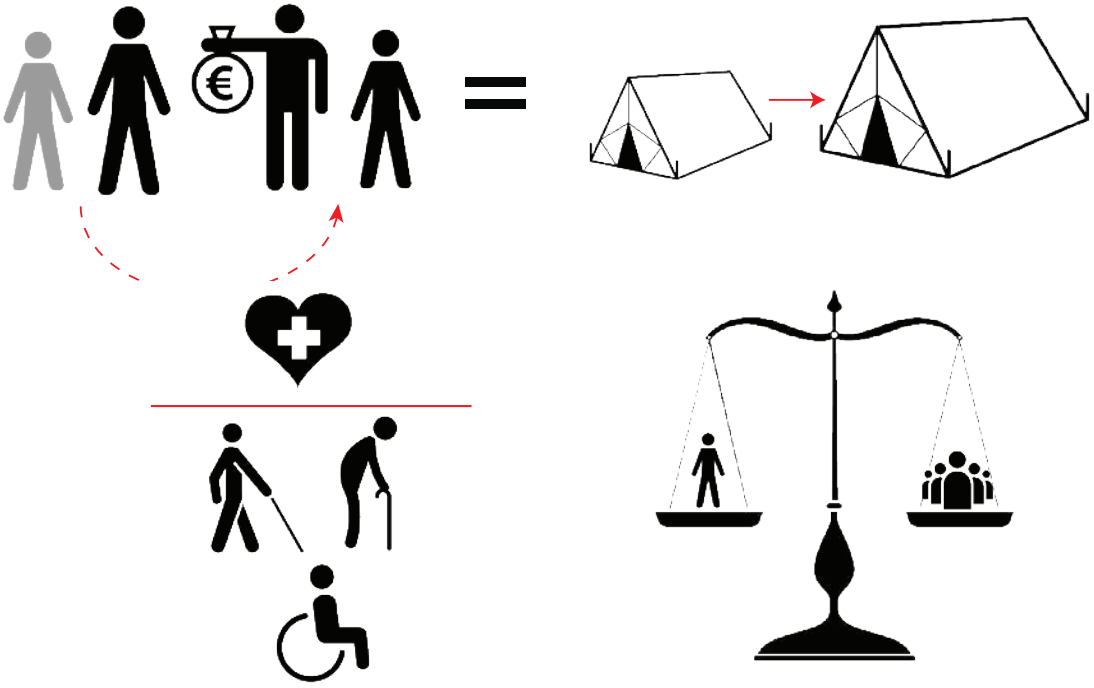
Even when people are provided with a shelter solution that is generic they will impose their culture onto it over time. The addition of local building methods and materials is a process that is seen over and over again in different case studies. To a western eye they may seem like sub-par solution, but in reality they could be more fitting for the climate then anything an aid organization provides. For example, by placing wooden stick paneling on the walls of the building the occupant has a more sturdy shelter that is still able to ventilate because of the space in between the branches. Rushes on the roof of buildings can be a good solution in rainy humid climates as they help keep out the water without trapping the heat.

1 IFRC, Shelter Projects 2009





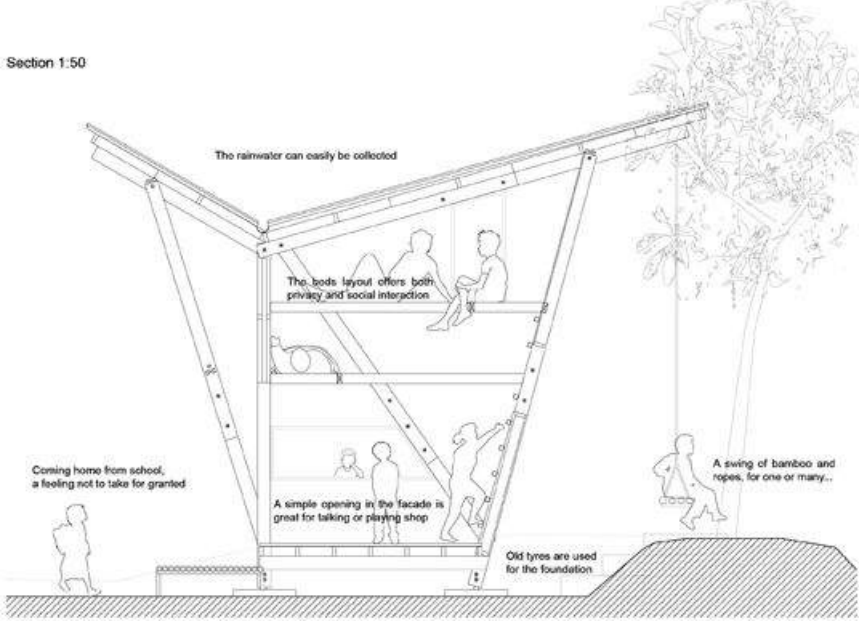


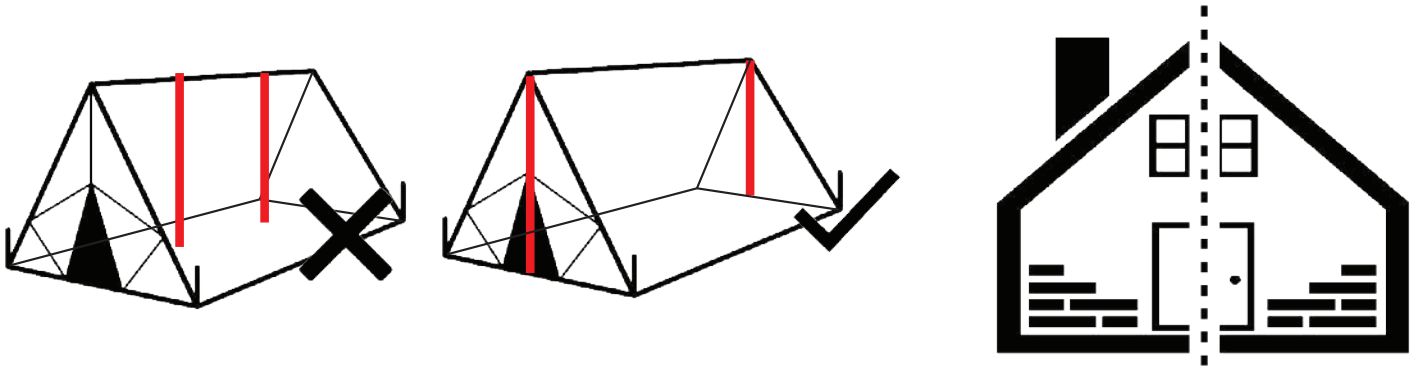


The Butterfly houses are an example of a structure design for an at risk group. Constructed to house the Karen refugee orphans in Thailand the structures take into consideration the particular needs and of the children. Their small size and multilayer sectional design appeal to the children at a fundamental level. They are fun spaces where kids can climb and play, as well as sleep. In addition to their sensitive and appropriate design they also include innovative building technologies, and incorporation of local building materials.[1]

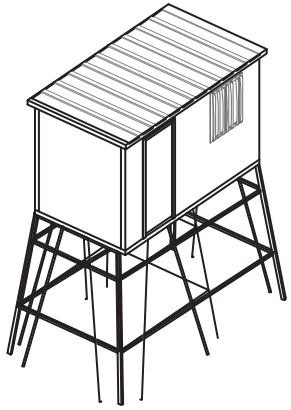
1 Aaronson, D. Design like you give a damn 2

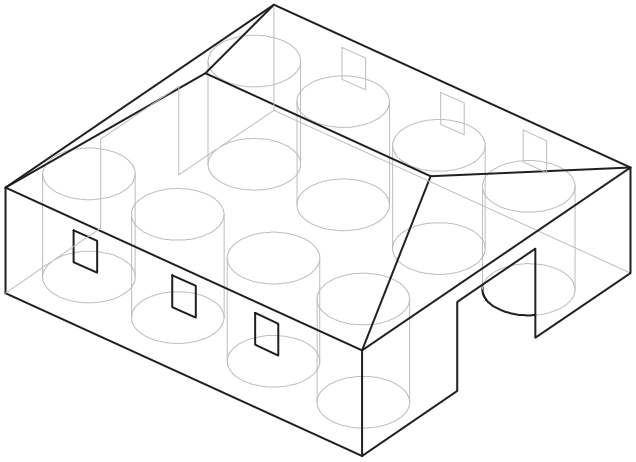
Soe Ker Tie Hias (Butterfly Houses)
Noh Bo, Tak province, Thailand

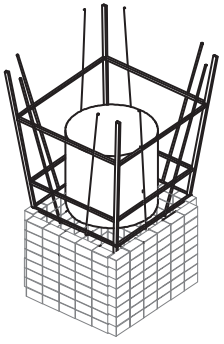




Although different building types are combined within the camp to expand a living space there are limitation on the adaptability. Where it is common to see two prefabricated units combined with a tent or concrete walls there is more possibility in other building combinations. In my analysis of the site I hypothesized what would happen if you combined the structures of the water storage units with other buildings. Their basic structure is a large plastic barrel sitting on top of a basic wooden frame system. The construction is one of the most stable in the camp as it must be able to support the weight of the water it holds. I will use these explorations as a foot hold into design.







Permanence vs. Impermanence

Within a refugee camp the terms temporary and permanent are often used. In minute reports camp managers will use these to describe areas that have changed as a result of modification or duration of time. These are relevant descriptions because even the most permanent structures in a camp are still temporary. In this section I will be using permanence to describe structures that have undergone enough modification to make them difficult or impossible to move. Their materiality is more stable and demonstrates structural rigidity. Temporary or impermanent structures are those that could be unassembled in a matter of hours or are in the same state as when they were deployed by the aid organization.

I The issue of temporality is one of the most important and ignored elements of any refugee camp. While local governments want to limit the number of people who will consume their resources, occupants will naturally seek a sense of permanence in their life. Aid organizations are often put in between these two juxtaposing groups attempting to find a solution. The disjointed relationship between the urban scale and individual shelter contributes to this disconnect. Shelter typologies, such as tents, are often implemented as temporary solutions but slowly evolve into permanent structures as occupants modify them. While governments and aid organizations are frequently asking what will happen when the camp closes, occupants are wondering whether they will even return home. The lack of acknowledgment leads to urban designs that fail to function permanently or temporarily.

Camp closures are often seen by the organizing groups as the ultimate end goal. Some of the longest standing camps have been there for decades, hosting part of the population that have lived their whole life in the camp. In many cases the camp has evolved to a point where even if the initial conflict were to subside it has become so permanent that it would be impossible to remove. In these cases it is assumed that the host country population would move in. Other options include the removal or demolition of buildings[1]. Aid organizations will sometimes reclaim tents and other temporary structures in order to move to a different disaster area where they are needed[2]. There is also the possibility that whole cities will be abandoned as the displaced populations within them are forced out. It is important to realize that these solutions fail to take into account the reality of refugee cities.

1 Corsellis, T, Transitional Settlement
2 OCHA, Tents: A Guide

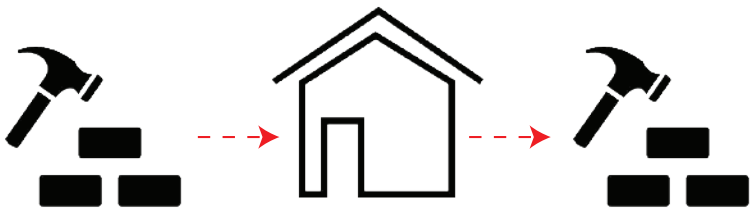
Building materials change as the phases of permanence set in. Plastic sheeting is often the first resource distributed to affected populations[1]. It is the primary material in the temporary phase of construction. Metal/plastic sheeting, wooden/metal poles, rope, and nails are among the other materials initially given to displaced people. A problem with this distribution is that the price of some of these materials, in particular metal, are so great that families will sell the pieces for cash in order to buy food or fire wood[2]. In return they may begin to cut down trees, or take advantage of local resources. This can escalate tension with the host country. The roof is the most important element of construction as it keeps away the rain and offers protection from the sun. The floor is the next element to be considered. The loss of body heat through the floor is the primary contributor to hypothermia[3]. Floors are initially made of compacted earth covered in plastic sheeting and blankets to provide insulation and waterproofing. As time passes occupants may invest in mattresses, beds, or raised floors in order to separate themselves from the ground.

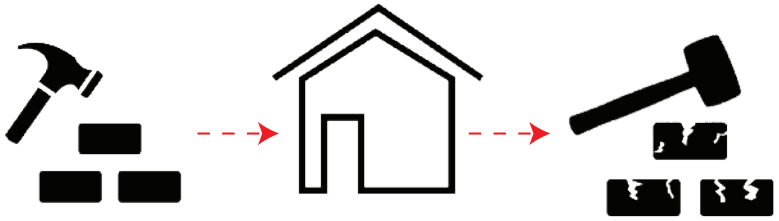
1 IFRC, Plastic Sheeting
2 NCR, Camp Management Toolkit
3 NCR, Camp Management Toolkit

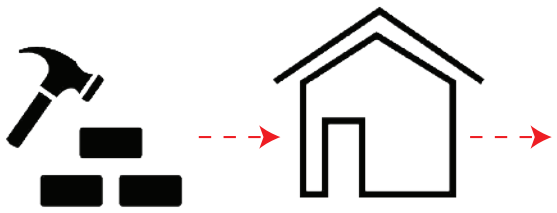
Temporary shelters will often transition into permanent buildings through maintenance and additions rather than replacements. Tent walls will begin to be filled with locally available resources such as mud or brick walls[1]. The initial plastic material will be utilized as water-proofing. The ability of the local population to maintain and repair their homes is key. By constructing the initial structure out of regionally available resources, occupants are given the freedom to take ownership.

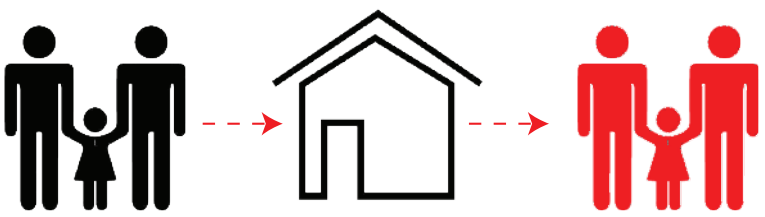
The Extreme Housing project was conceived as a deployable unit to provide to people displaced from their home but still occupying their property. Included are town units, one for cooking the other for hygiene, and a bed that spans between them. Occupants were supposed to place the structure either next to their home or inside while they made repairs or reconstructed. The option to provide all services in one unit presents an interesting alternative to making people walk to communal bathrooms or cooking areas.

1 Corsellis, T, Transitional Settlement

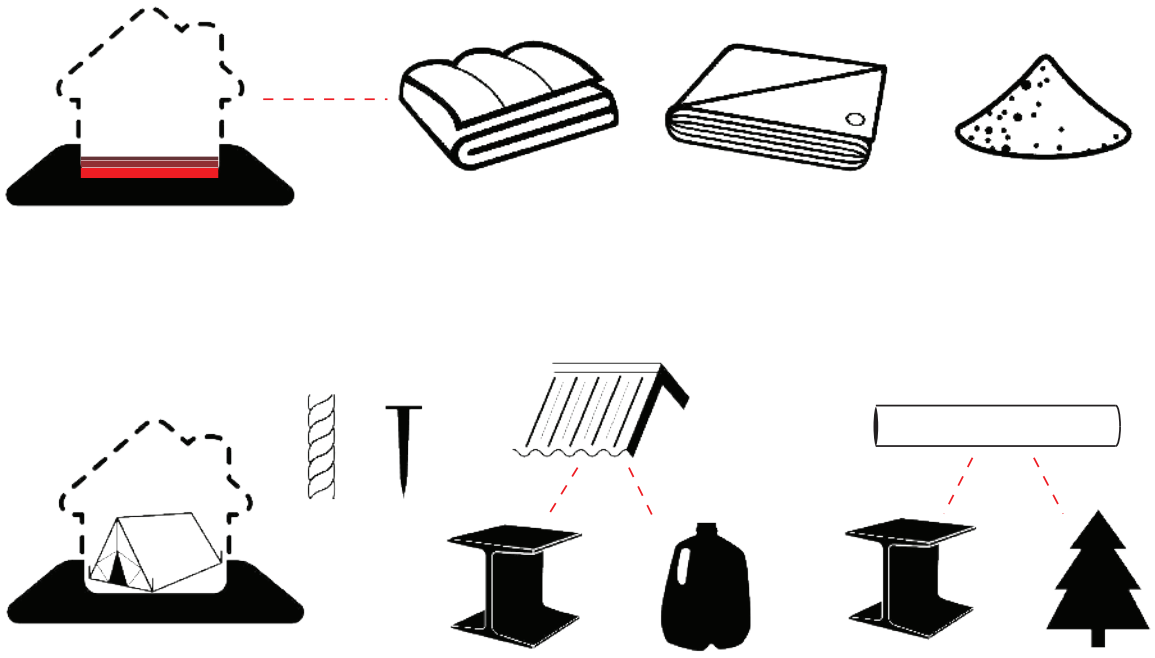








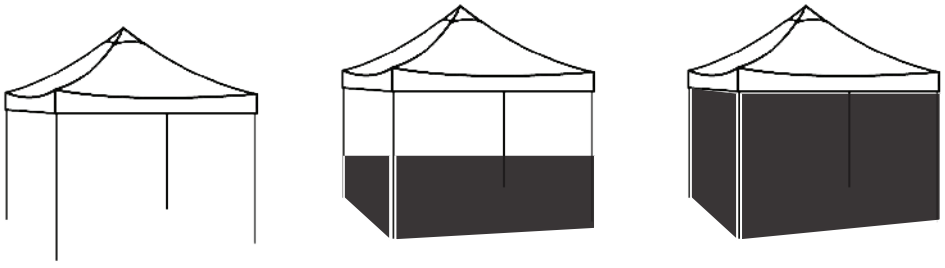
Extream Housing
prototype

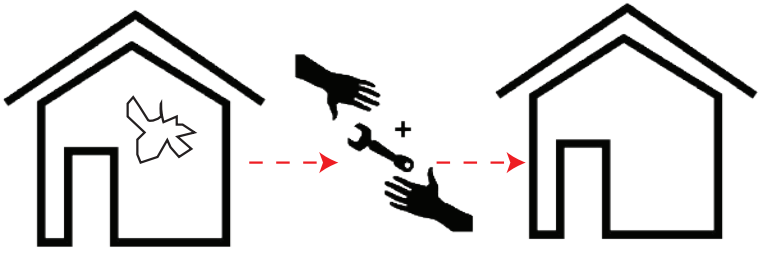


The site of the Zaatari camp means that local materials are scarce. Its desert location provides no forest, or even water to create mud structures. All building material, water, food, and other resources are trucked into the site daily[1]. When people want to construct additions they must purchase concrete blocks, or similarly materials, at a store and transport it back home. Lack of material will prove as a main point of focus in my intended design.

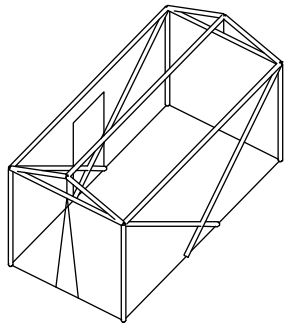
1 UNHCR, Refugee Response

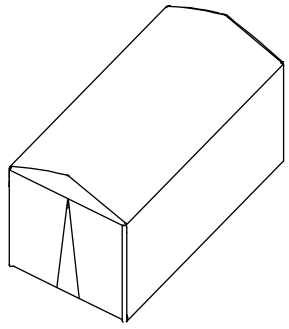

UNHCR

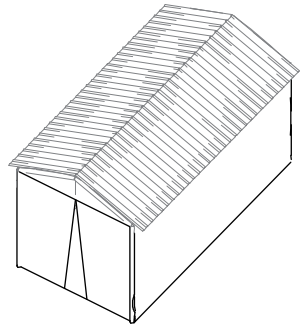


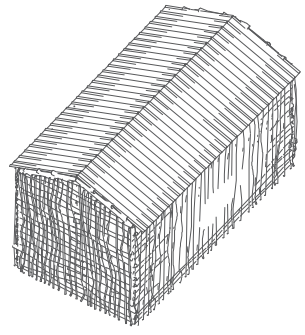


Aid provided solutions provide the structural basis for all shelters in the refugee camp. The structure that was originally used to support just plastic sheeting is forced to hold up much heavier wooden or metal roofs. This limites the flexiblity and adaptability of the shelters. The inclusion of stronger supports would allow people to try different solutions. Aid organization will conduct periodic building inspections to make sure people are not over taxing the structural supports.



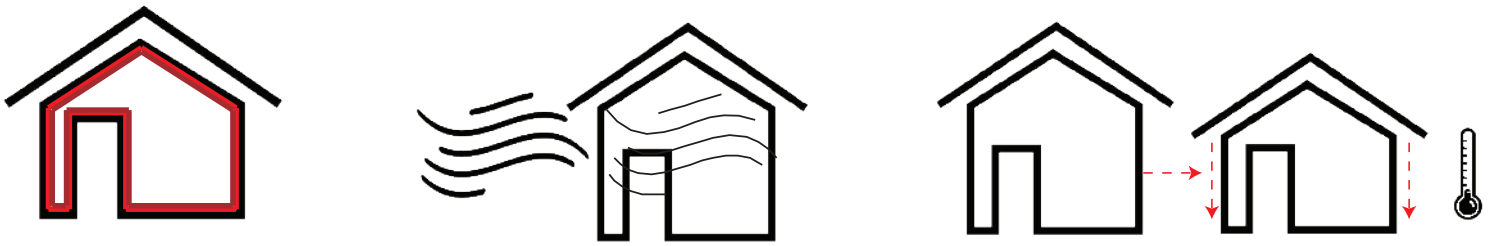






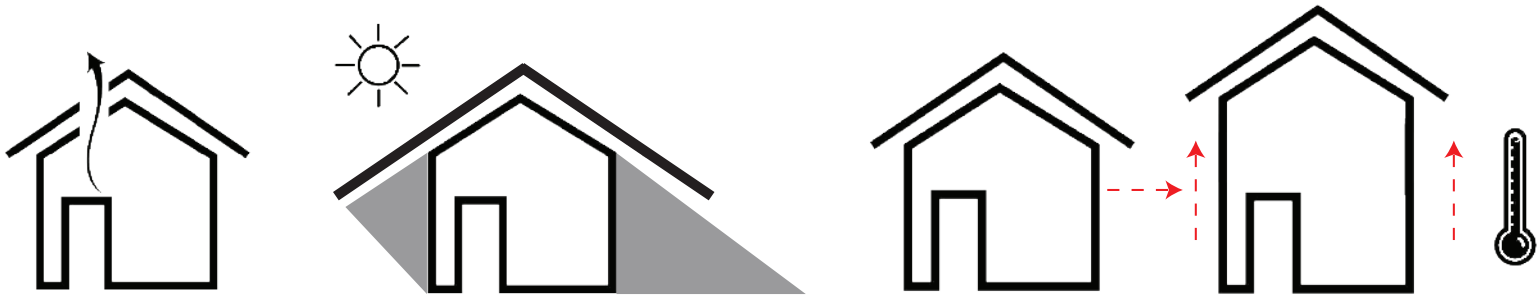
Environmental effects

Refugee camps often have detrimental effects on the local landscape and environment. The large population accelerates erosion and turn areas into large dust fields. The host country wishes to maintain their natural resources and landscape, creating restrictions on camp locations near preservation areas. The displaced population will often be so focused on making it through the season that they have little consideration for another countries resources. It is rare to find vegetation in camps as it will quickly be turned into a resource for livelihood. Some settlements have integreated the use of small cooking gardens placed in the fire breaks in order to provide food as well as environmental protection. The environmental mis-treatment is frequently a two way street, with people suffering through climatic conditions that they are ill prepared for. Shelter solutions are generic and take little to no consideration of the climate they are located in.



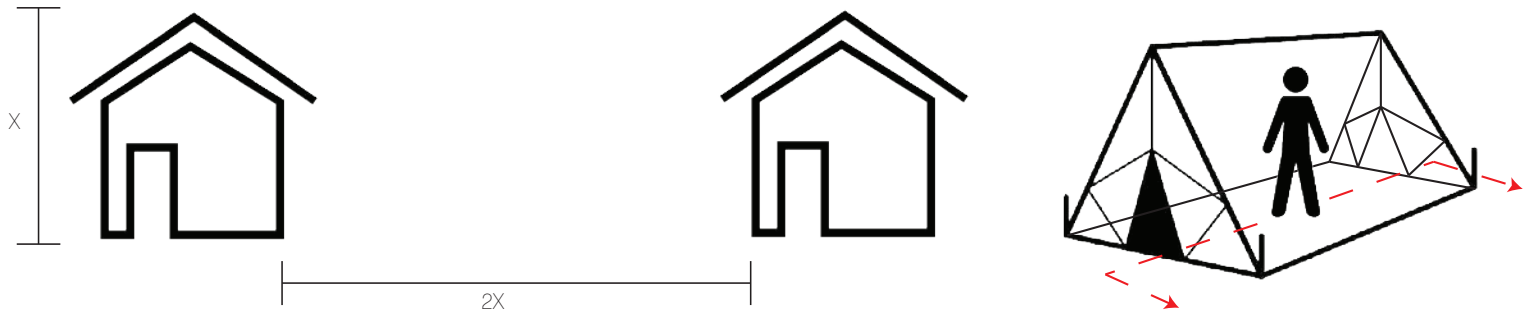
Cold weather climates pose the greatest threat to health and safety. Shelter solutions have little to no regard to the damp and low temperatures that people inhabit. The primary concern is to keep the space next to the skin warm[1]. This means that the first resources given out are layered clothing, blankets, and tarps. Shelters should be designed to reduce the possibility of a draft by keeping openings closed[2]. This creates another problem of smoke from cooking fires. Families will often maintain fires inside of their structures, if firewood is available. While this allows some heating it also contributes to health and fire risks. Shelters in cold climates often have lower walls, which means less air to heat but also less room for smoke to ventilate. Winterized tents are utilized in situations where there is no alternative. These have one layer of fabric, cotton insulation, and a fly sheet[3]. They are often equipped with a place to put a stove pipe in order to help minimize fire safety risks.

1 NCR, Camp Management Toolkit
2 OCHA, Tents: A Guide
3 OCHA, Tents: A Guide



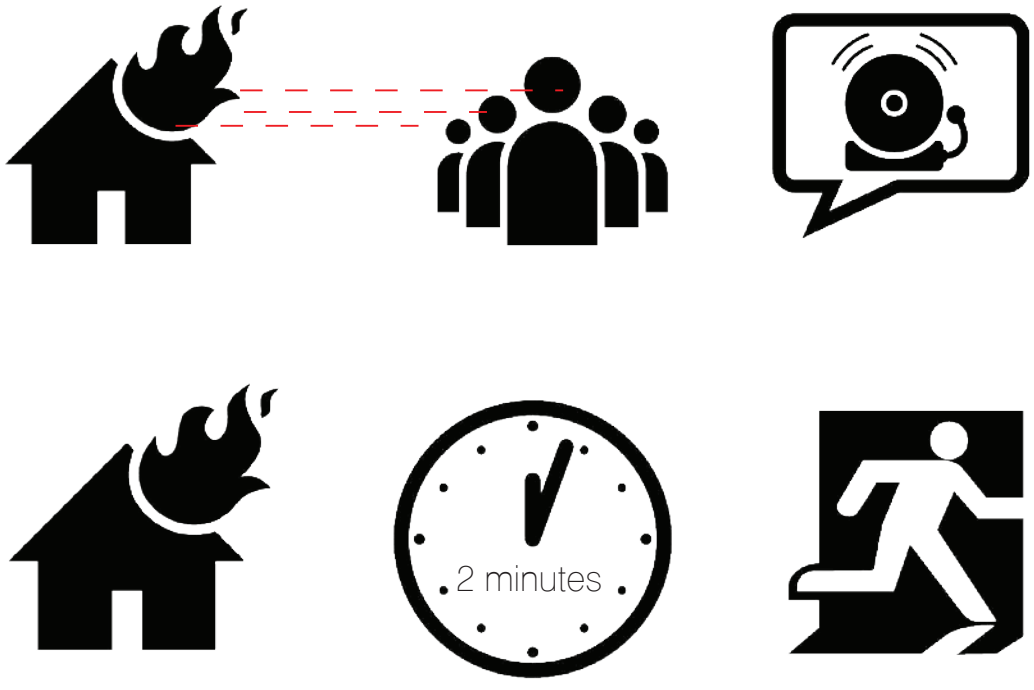
The primary concern in hot climates is over exposure. It is assumed that people will be spending most of the day time outside of their structures. Shade is of paramount importance. Families will often attach porches of sorts to the front of their homes so they can sit outside during the day[1]. Good ventilation should be included in these situations through the use of operable windows and doors. Structures tend to be taller to allow the hot air to rise away. The solutions suggested by aid organizations for both cold and hot climates are often generic and offer few suggestions that occupants wouldn't already be aware of. Greater consideration should be given to alternative and historic building practices that have confronted these issues.

1 Corsellis, T, Transitional Settlement



Fire safety is one of the largest concerns for aid organizations. It is hard to establish fire code in a community where the occupants are constantly struggling to survive. Some of their basic rules include the spacing of individual shelters two times apart the height of the building[1]. This insures that if the building were to fall over in a fire it wouldn't fall on top of the people living next to it. All structure are required to have two opposite openings to facilitate escape in even of fire[2]. Although these are basic instructions, even their implementation proves a problem. The lack of space in the camps means that any space left to prevent fire will be filled by more incoming families. Additional divisions within shelters by occupants can frequently lead to the blockage of an exit.

1 NCR, Camp Management Toolkit
2 UNHCR, Handbook for Emergencies

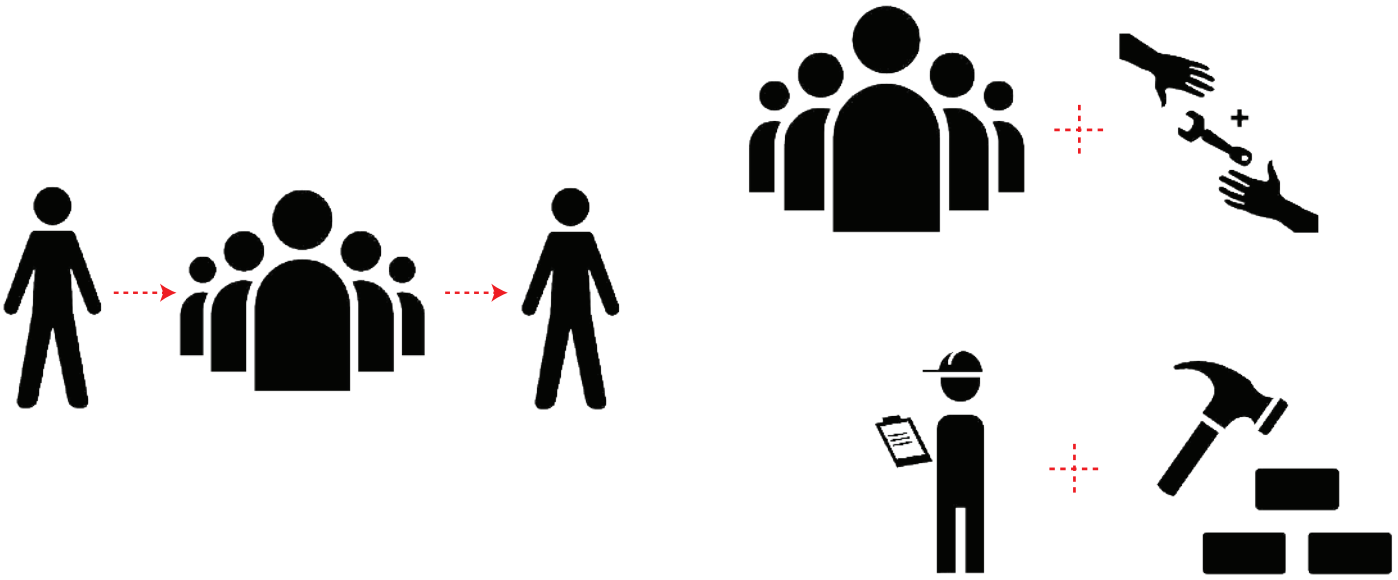


Making sure the local population is aware of the fire risk is also a difficult yet necessary task. Some camps have chosen to implement a human alarm system by providing whistles to families that they can blow in the event of a fire starting[1]. Understanding the context is also key to fighting the spread of fire. Water is not readily available in most places, and alternatives such as dirt or sand may be more applicable. Basic egress rules in the camp ensure that there is a two minute exit time in any building. The modification of camp and shelter design could help to solve these safety risks.

1 UNHCR, Handbook for Emergencies

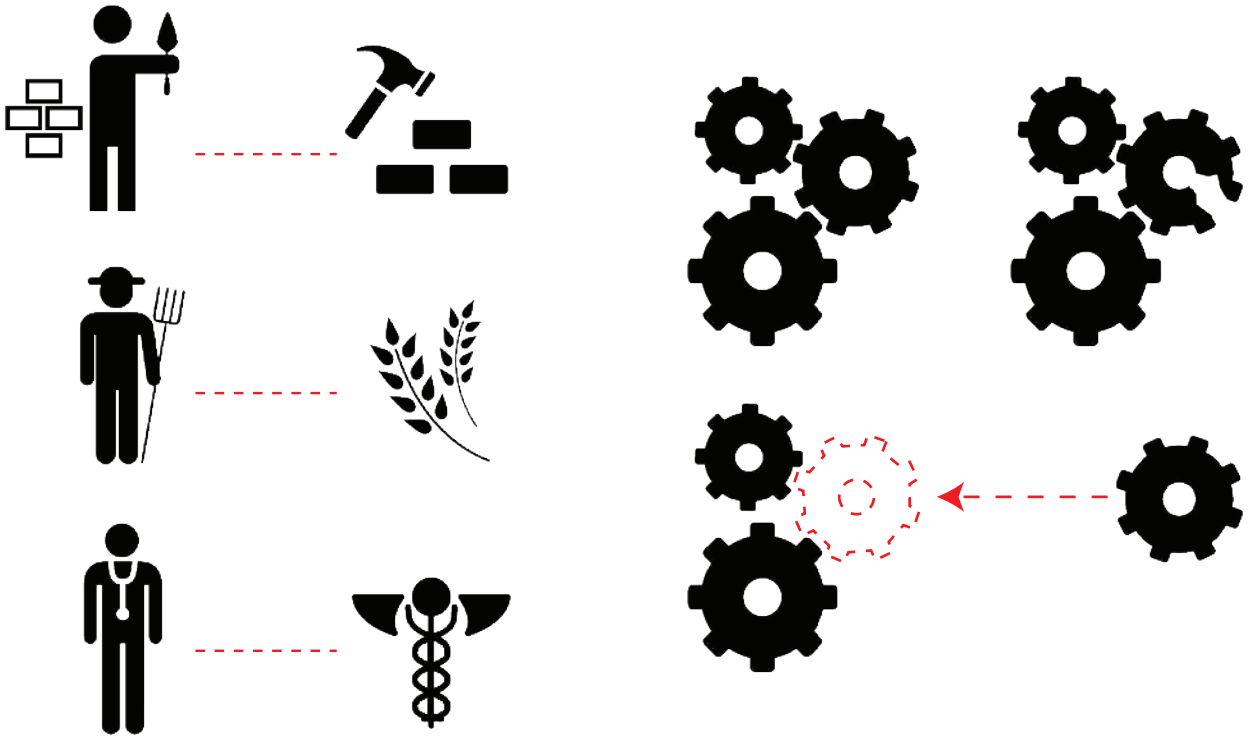
Where aid stops

The previous categories all elude to the fact that at some point the aid will stop. Organizations want occupants to take charge of their surroundings, because eventually it will become their sole responsibility. While aid organizations will never fully abandon an active camp, decreases in staffing and resources can occur. Shelter solutions should be implemented with the understanding of the refugees leadership in mind.



The organization of aid is multilayered. The affected population are the first people to begin camp construction. Displaced people arrive at the camp location at least a day, and often more than a week, in advance of any organization. Many groups will initially act as guides for reorganization. In some cases the aid material will arrive before any people[1]. Tarps and emergency kits will be distributed by local authorities. It is important to use the affected population to help rebuild so a sense of helplessness doesn't set in. Partial control of their environment may help them recover. Construction methodologies can assist this process. By having the refugees directly build part of the organization, they will learn skills to repair and maintain their shelters. Another option is to contract out to other groups but this may have adverse effects.[2]

1 UNHCR, Handbook for Emergencies
2 UNHCR, Handbook for Emergencies



Community plays a key role in the continuation of the settlement after the aid decreases. Just because the population has been displaced doesn't mean they have lost their skills. Finding out their individual skills and integrating them into construction is a fundamental way to acclimate them to their new surroundings. Cultural relevance of construction can increase chances that when aid organizers leave people will be more capable of maintaining the camp. Initial distribution of materials should take into consideration the long term needs of the population. Shelters, such as tents, should be distributed as complete packages including tools needed for assembly, blankets, ect.[1] Repairs should be able to be completed by the affected population. Interchangeable parts make sure whole structures don't have to be replaced every time a part fails. Design decisions should be implemented with the skills and needs of the refugees in mind.

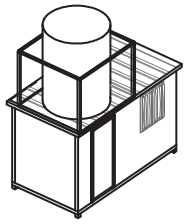
1 NCR, Camp Management Toolkit

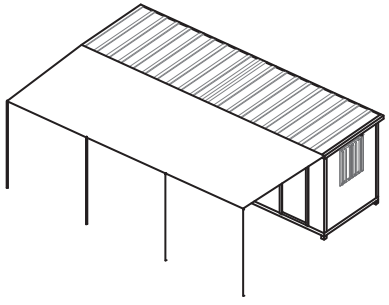
The workings of a Refugee camp and multifaceted and range across a variety of scales. Handbooks produced by aid organizations provided a small window of insist into the complexities that a design has to deal with. By comparing the proposals in the manuals with the reality found in the Zaatari Refugee camp and other case studies, strengths and weaknesses can be seen. The current design process moves systematically from layout to deployment. It successfully deploys aid to large quantities of people in a short amount of time. For all of its efficiency's the camp layout and individual structures lack an understanding for how the built environment effects its occupants. It is clear that aid organizations believe quick response time and a community relevant design cannot be achieved at the same time.

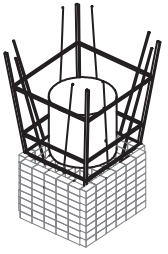
By using the three primary categories I discussed (scale, community, and permanence) my design will seek to move the designer to the front lines of refugee settlement. The integration of layout between camp scale and individual scale will allow for a more community oriented society. Due to the influx nature of refugee camps both of these scales need to include elements that can adjust for the expansions and movement of the population.

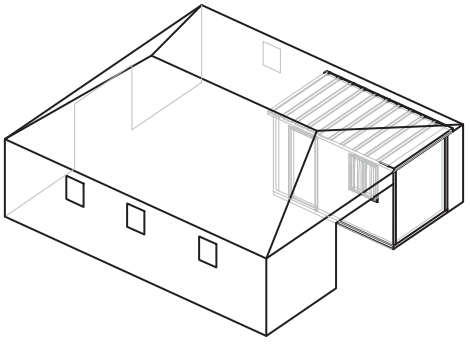
In future design phases I will be focusing on how an architectural intervention can turn the undefined open space within a refugee camp into informal public gathering spaces. The design will focus on flexibility and adaptability as a tool for breaching the gap between camp design and individual space. Research will continue into the next phases so that there is constant integration of current conditions and proposed solutions. In addition further study will be dedicated to the study of cities in Syria, and the public spaces used there.

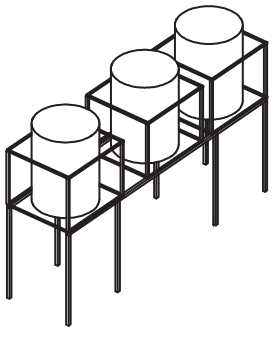
A starting point for design will be the various combinations of existing structures on the site. Unlikely combinations will tease out possible solutions or phasing to be utilized in an organized manner. Although some of these combinations seem impractical, their resultant forms would include systems that the refugees and aid organizations are already familiar with.

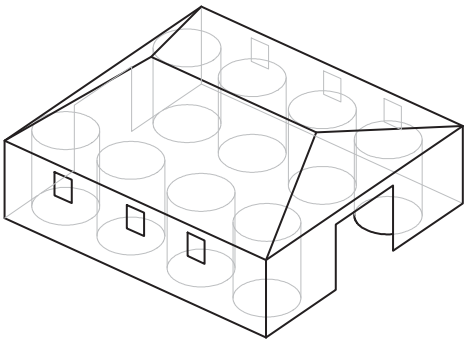


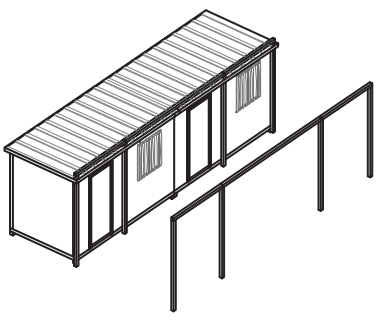


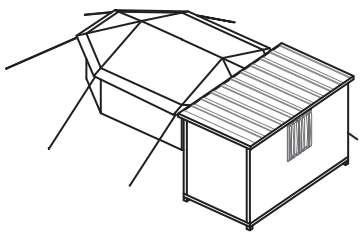






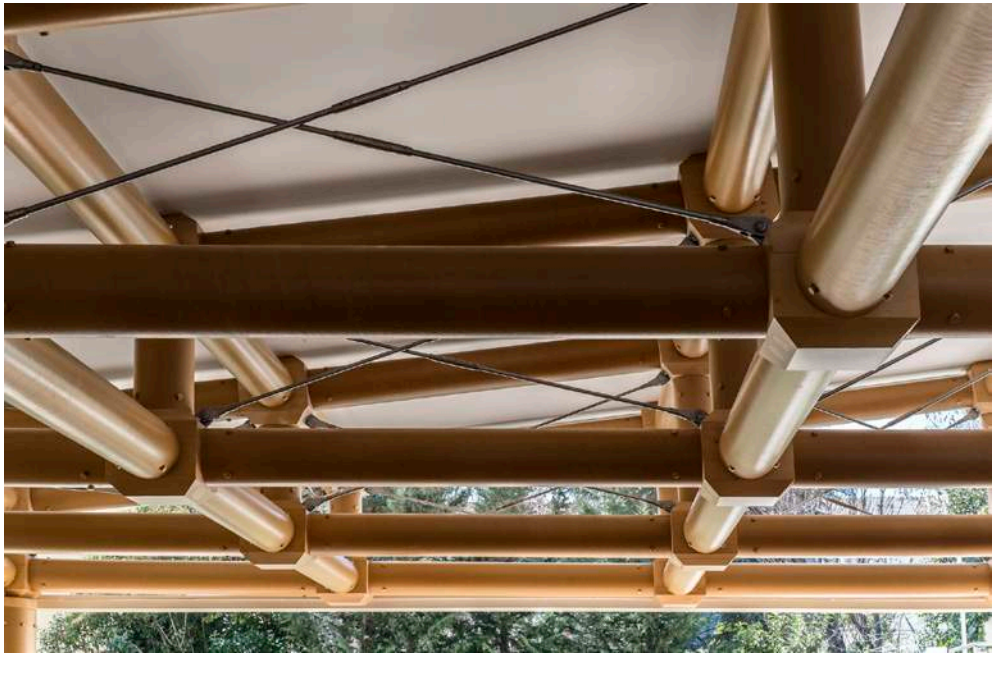






Further exploration will be into alternative construction and material methodologies. Shigeru Ban Architects is one of the many firms experimenting with different materials. His paper tube architecture combines inexpensive material with sturdy construction. In addition there are evolving technologies for underdeveloped countries that could have a place within refugee design. In Designing for the other 90% by Cynthia Smith some of these technologies are discussed. The combination of low cost yet sturdy construction provides an opportunity to experiment with different technologies.

The Refugee crisis and in particular the case seen in the Zaatari refugee camp in Jordan demands a solution that is functional yet culturally relevant. Any intervention needs to look at the complex issues of politics, environment, and existing condition as opportunities to introduce an architecture that works for all occupants of the camp.



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