

Assessing the Sheltering Response in the Middle East: Studying Syrian Camps in Jordan

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Abstract—This study focuses on the sheltering response in the Middle East, specifically through reviewing two Syrian refugee camps in Jordan, involving Zaatari and Azraq. Zaatari camp involved the rapid deployment of tents and shelters over a very short period of time and Azraq was purpose built and pre-planned over a longer period. At present, both camps collectively host more than 133,000 occupants. Field visits were taken to both camps and the main issues and problems in the sheltering response were highlighted through focus group discussions with camp occupants and inspection of shelter habitats. This provided both subjective and objective research data sources. While every case has its own significance and deployment to meet humanitarian needs, there are some common requirements irrespective of geographical region. The results suggest that there is a gap in the suitability of the required habitat needs and what has been provided. It is recommended that the global international response and support could be improved in relation to the habitat form, construction type, layout, function and critically the cultural aspects. Services, health and hygiene are key elements to the shelter habitat provision. The study also identified the amendments to shelters undertaken by the beneficiaries providing insight into their key main requirements. The outcomes from this study could provide an important learning opportunity to develop improved habitat response for future shelters.

Keywords—Culture, post-disaster, refugees, shelters.

I. INTRODUCTION

MIDDLE Eastern countries have been leading providers in welcoming refugees due to their close location to refugee origins. The top six refugee hosting countries in the world include four Middle Eastern countries: Turkey, Lebanon, Iran and Jordan [1].

Throughout the many conflicts that have occurred and are still on-going in the Middle East, Jordan has managed to provide support and help by hosting refugees from neighboring countries. The Palestinian camps in Jordan that were established after the 1948 and the 1967 wars in Palestine are cases to learn from. There are approximately two million registered refugees within United Nations Relief and Works Agency (UNRWA), of which, 370,000 are accommodated in 10 recognized camps [2]. The camps are still operating at the time of this publication with major housing issues, some of these include: the provisional status of refugees, the construction restrictions from the host government and the

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isolation of camps from the urban fabric [3]. Jordan is currently hosting more than 1.3 million Syrians, who fled the Syrian civil war that erupted in 2011. Up to February 2017, only 656,170 of the Syrians in Jordan were registered as refugees within the UNHCR records [4]. There are five formal Syrian camps in Jordan: Zaatari, Azraq, Emirati Jordan Camp (EJC), King Abdullah Park (KAP) and Cyber City [5].

II. METHODOLOGY

To understand the current approach taken in setting up the camps, issues around supporting large groups of refugees and the habitat societal challenges, field visits including direct observation and focus group discussions with refugees were undertaken. Visits were focused on the two largest Syrian camps in Jordan; Zaatari (which also considered the second largest in the world after Dadaab complex in Kenya, or the fifth if the camps in Dadaab were counted separately [6]), and Azraq, a purpose-built camp. The field visits were undertaken in January 2016 and latest population statistics are taken from February 2017, unless denoted differently.

Zaatari camp has an area of 5.3km² [7], hosting 79,737 refugees [4]. It is divided into 12 districts, each district breaks up into numbered parcels of land with defined borders called 'blocks', and each block has many shelters (Fig. 1). Azraq has an area of 14.7km² [8] hosting 53,833 refugees [9]. The camp is divided into villages, blocks, streets, and numbered shelters. Only villages numbered three and six were opened and used when the study was taken. The outline of the camp is shown in Fig. 2.

III. ZAAATARI CAMP

When the Zaatari camp was opened in July 2012, the UNHCR provided 70,000 emergency tents to families. But due to the climatic extremes in Jordan and specifically in the northern desert where the camp is located, ranging from winter heavy snow storms to summer high temperatures of over 40°C, agencies decided to replace tents with a more dignified and protective pre-fabricated shelter [9]. The shelter dimensions are (5 m x 2.5 m). The formal original layout of the camp was a grid system where shelters were organized in rows. However, the residents then re-positioned their shelters in compound-like areas, usually forming a U-shape or courtyard. This new layout allowed them to live closer to their extended families and helped in other cases to reconstruct their previous community layout. But these changes formed a maze-like camp map [12]. A street view of the camp is shown in Fig. 3.



Fig. 1 Zaatari camp general map [10]



Fig. 2 Azraq camp top view [11]

Zaatari-Key Building Performance and Function Factors:

- *Walls and roofs:* The prefabricated shelters were made from polyurethane insulated sandwich panels. A section of the wall can be seen in Fig. 4, which was recycled from a shelter's wall and used as a side garden fence. The shelters' quality differs from one to another, but the majority have weaknesses in building fabric leading to air,

dust and water ingress. This is a contributing source towards health problems affecting camp residents.

In an attempt to seal the shelters, especially the roof-wall junctions (Fig. 5), the residents covered the roofs using fabrics they had or bought them, if they could afford them. Some families also tried to expand their shelters by enclosing a space using corrugated sheets and then covered it with fabric,

which is not a durable solution and cannot replace a proper roof (Fig. 6). The expanded area fulfilled some major needs such as providing separated sleeping areas for different genders and ages within the family, or providing a separate area for socializing and receiving guests. Social interaction can be an important aspect to communities in general. This is perhaps more critical for refugees to assist interaction and alleviate the trauma of leaving their home and country.



Fig. 3 Zaatari camp street view [13]



Fig. 4 A section in the wall [13]



Fig. 5 Gaps between junctions [13]

- **Floors:** The original shelter floor was made from wood. This is an unfamiliar floor material to the residents. In addition, the floors were damp and caused a musty smell due to water ingress. The floor materials and cavities beneath were easily accessible by rats. This led the residents to replace the wooden floor with concrete.
- **Windows:** It was found that amendments made by residents to improve privacy was also affecting the

ventilation function of the shelters. Residents covered their windows from the outside or from the inside (Fig. 7) due to passers-by being able to look into the shelter. Residents stated that having privacy was a necessity and a priority and aligned strongly with cultural and religious beliefs.



Fig. 6 Extended area example [13]



Fig. 7 A covered window to protect the privacy [13]



Fig. 8 Self-built kitchen [13]

- **Facilities:** When the camp was first opened, the kitchens and toilets provided were communal. Problems occurred when using such communal facilities from both cultural and privacy/security perspectives. It was found that when residents could afford some materials, they adapted and self-built private facilities adjacent to their shelters. These adaptations private facilities included enclosing additional space with corrugated sheets, wood and canvas, if the residents were able to afford materials (Figs. 8 and 9).
- **Outdoor areas:** The courtyard is an important cultural feature in Syrian homes and enclosing an outdoor space

was found to be very important to the camp residents. They often enclosed a space next to their shelter or between two shelters with canvas or corrugated sheets, as shown in Fig. 10. One of the main benefits of such a private area was for women residents to have access to an outside space. This provided safety, privacy and aligned to their cultural needs.



Fig. 9 Self-built kitchen [13]



Fig. 10 Private outdoor area [13]

- **Drainage:** One of the main problems found at the time of the camp visit was the absence of a sewage system. The residents had dug ditches in the ground or used pipes to discharge the wastewater (black and grey) to outside pits (Fig. 11). The ditches from different households created networks of surface runoff, as shown in Fig. 12, aligned to the direction of the sloping ground. Exposure to this type of contamination can lead to further health complications.

Main types of wastewater disposal in the camp, according to a study done by REACH organization [14], are as follows:

- household storage (pit, barrel, tank)
- surface run off (ditch or throwing on the ground)
- connection to drainage network or tank of WASH block

During the visit, concrete based storage tanks for wastewater disposal were located in the streets for future underground installation as part of a planned sewage system. They were not installed at the time of this study visit.

- **Water and electricity:** Water truck deliveries to storage tanks are provided to each household every three days. The residents are provided with 35 liters per person a day. This was often not sufficient for their use and sometimes if they had the financial ability, they would buy more water.

When the camp first opened, there was no electricity. However, at the time of the visit, electricity had been supplied

for 11 hours per day. The introduction of electricity and lighting in the camp has improved the residents' quality of life.



Fig. 11 Outdoor pits [13]



Fig. 12 Surface runoff wastewater [13]

IV. AZRAQ CAMP

Azraq camp is the second largest formal Syrian refugee camp in Jordan, nearly 50 miles south-east of Zaatari (Fig. 13). It is a purpose-built camp, which has taken account of lessons learnt from the Zaa'tari camp. The camp opened in April 2014 due to the increasing number of refugees in Jordan. It was constructed with 13,500 T-shelter units to accommodate 67,000 refugees [16], but according to UNHCR statistics, only 39,893 Syrians were living in the camp until April 2016 [4]. Recently, since the Zaatari camp was unable to receive more refugees, all new arrivals were directed to the Azraq camp. The number of Syrian residents in the camp until February, 2017 are 53,833 [4].

The T-shelter's dimensions are (4 m x 6 m). The main components are: metal cladding with flashing, aluminum panels, foam insulation, interlocking steel structure, plastic sheeting as an internal roof and a reinforced concrete floor [16], [17].

Azraq - Key Building Performance and Function Factors:

- **Walls and roofs:** The junctions between the walls and the roof are not well-sealed and were found to leak water and dust. Residents mentioned they preferred a flat roof rather than a pitched roof, as they thought this would be easier to seal and it was more familiar to them. Due to the camp's strict policies regarding making any changes to the shelters, residents could not change the roof. The wall heights were low; however, the pitched roof design did provide more head-room. The overlapping of the internal metal cladding sheets resulted in sharp edges, as shown in Fig. 14, and residents had stated that injuries had occurred.



Fig. 13 Street view from Azraq camp [15]



Fig. 14 Sharp edges in cladding [15]



Fig. 15 Blanket dividers [15]



Fig. 16 The T-shelter window [15]

The shelter is a basic design involving a one-room plan. The original design had indicated ‘partitioning wires’ to support fabric room dividers, but were never installed. Residents believe that it is not acceptable culturally nor religiously to have different ages and genders sleeping in the same room. They erected their own fabric dividers using their own sheets or blankets as and when required (Fig. 15).

- **Windows:** Shelters in Azraq camp have only one small window (Fig. 16). The problem is increased as residents close their windows and shade them using fabrics because they directly overlook public areas or other residents’ windows and do not provide adequate privacy.

The shelter also has ventilation pipes that fit into openings of the wall cladding. However, the residents closed them with plastic bags to limit the dust ingress (Fig. 17). The summer season in Azraq is very hot, and as such, the defects in the shelters’ design, materials and small windows increased the occupants’ dissatisfaction. Some residents tried adding

openings in the walls as extra windows, as shown in Fig. 18.



Fig. 17 Ventilation pipes closed [15]



Fig. 18 A self-made opening [15]



Fig. 19 Communal unit for toilet and shower [15]

- **Facilities:** Toilets are communal in Azraq camp and each unit (toilet and a shower) is used by approximately three families (Fig. 19). Residents had ceased to use the communal showers due to safety concerns and opted to shower in their own shelters using buckets of water. The shelters were not designed to have internal showers nor is their space provision. The main difficulties regarding using communal facilities are:

- hygiene problems: used by large numbers,
- distance problem: using the toilets in winter is problematic, especially for children, due to the distance and the harsh weather,
- ground turns into mud after raining, and
- lack of security and safety: specifically, for children and women at night.

The residents were not provided with private or communal kitchens. Cooking equipment was given to residents to utilize in a corner of their shelters as a kitchen space. This included stoves and gas cylinders as shown in Fig. 20. Cooking inside the shelters was one of the causes behind the respiratory problems the residents had mentioned.

- **Outdoor areas:** There are privacy concerns in the camp

and an absence of private social spaces whether outside or inside. Fig. 21 illustrates residents sitting in the shade close to the edge of an external wall. This shows the importance of this external space for socializing. The residents tried to overcome the problem by removing the inner lining of the shelter roof (plastic sheeting) to use as an exterior partition to form a private outdoor space (Fig. 22).



Fig. 20 Kitchen tools [15]



Fig. 21 Original gap between shelters [15]



Fig. 22 Enclosed outdoor area [15]

- *Drainage:* The absence of a drainage system is a problem in the Azraq camp. The residents formed ditches to outside pits and aligned different ditches to form a network of surface wastewater channels adjacent to the streets, as shown in Fig. 23. In addition to hygiene problems, it also leads to accessibility issues for people with special needs and elderly, trying to cross over the wastewater.



Fig. 23 Surface runoff wastewater [15]

- *Water and electricity:* Water taps are distributed around the camp, as shown in Fig. 24, and are piped from the primary main water tanks located on the camp edge. There is approximately one tap for every three blocks and operates from 7 a.m. – 12 p.m. and from 7 p.m.-12 a.m. Residents fill up bottles or containers (if they have enough) for their daily usage. There is no limit for the amount of water they can take, but there is long distance to reach the closest tap. Children are the primary water carriers, which can be up to 20 liters per day according to the residents.

The only source for electricity in the Azraq camp is solar lamps (Fig. 25). Shelters have one or two lamps but no additional devices, other than mobile phones, can be operated by these lamps.



Fig. 24 A water tap [15]



Fig. 25 Solar lamp [15]

V. DISCUSSION

Comparing past and current case studies shows that unfortunately some mistakes from the Palestinian camps in the 1940's and 60's are being repeated within the Syrian camps in Jordan. In the Zaatari camp, the shelter's design does not take account of the cultural, security, and privacy concerns, and the

lack of extension possibilities and absence of suitable facilities and social spaces were key factors.

The changes and adaptations made by Zaatari residents to their shelters were an attempt to fulfill these needs. However, some of these changes increased health issues, flammability, and privacy and security concerns. This also led to a more random urban development.

Contrary to Zaatari, Azraq camp's strict policies prevented the residents from making changes to their shelters. These policies succeeded in having an organized urban pattern for the camp, but this was less satisfactory for residents interviewed during the visit.

Comparing the performance of the main elements in both camps with the Sphere Handbook [18], (the main reference for the minimum standards and indicators for post disaster shelters), it was found that there were major gaps between Sphere recommendations and what was provided. Primary gap areas included the habitable living area per person, separation between genders and different age groups, capacity to extend shelters, protection from rain and storms, and provision of adequate sanitation facilities and site drainage. Further issues included having inadequate ventilation, lack of flexible space for internal room division and most importantly, non-culturally appropriate shelter design made from unfamiliar materials and construction techniques.

Learning from past mistakes creates an opportunity to provide better shelters for the camps' residents, and at the same time, keep control over the urban fabric in the hosting country.

In future, the development of a preplanned shelter design for every region, which shares the same culture and close environmental conditions, could save significant time and efforts during emergencies and potentially lead to a more robust approach and an improved quality of life.

REFERENCES

- [1] UNHCR, (2017a). *Figures at a Glance*. (online) UNHCR. Available at: <http://www.unhcr.org/uk/figures-at-a-glance.html>.
- [2] UNRWA. (2015). *Jordan | UNRWA*. (online) Available at: <https://www.unrwa.org/where-we-work/jordan>.
- [3] Rueff, H. and Viaro, A. (2009). Palestinian Refugee Camps: From Shelter to Habitat. *Refugee Survey Quarterly*, 28(2-3), pp.339-359.
- [4] UNHCR, (2017b). *UNHCR Syria Regional Refugee Response*. (online) UNHCR Syria Regional Refugee Response. Available at: <http://data.unhcr.org/syrianrefugees/country.php?id=107> (Accessed 22 Feb. 2017).
- [5] Protection Sector Group, (2016). *Protection Sector Operational Strategy for 2016*. 1st ed. (e-book) Available at: <https://data2.unhcr.org/en/documents/download/43783>.
- [6] The Refugee Council, (2016). *The 7 largest refugee camps in the world*. (online) [Refugeecouncilusa.org](http://www.refugeecouncilusa.org). Available at: <http://www.refugeecouncilusa.org/the-7-largest-refugee-camps-in-the-world/>.
- [7] UNHCR, (2016b). *Zaatari Refugee Camp factsheet*. (online) Available at: <http://reliefweb.int/sites/reliefweb.int/files/resources/FACTSHEET-ZaatariRefugeeCamp-April.pdf>.
- [8] UNHCR, (2016a). *Azraq Refugee Camp*. Available at: <https://data.unhcr.org/syrianrefugees/download.php?id=12302>.
- [9] Touaibia, N. (2015). *Giving new life to shelter materials at Jordan's Zaatari Syrian refugee camp - Humanitarian Aid and Civil Protection - European Commission*. (online) European Commission- Humanitarian Aid and Civil Protection. Available at: <http://ec.europa.eu/echo/blog/giving-new-life-shelter-materials-jordan-s->

[zaatari-syrian-refugee-camp_en](#).

- [10] Google Maps, 2017. *Zaatari Refugee Camp, Jordan*. (online). Google. Available from: <https://www.google.co.uk/maps/@32.294227,36.3289004,6416a,35y,19.41h/data=!3m1!1e3> (Accessed 25 April, 2017).
- [11] Google Maps, 2017. *Al-Azraq Camp, Jordan*. (online). Google. Available from: <https://www.google.co.uk/maps/@31.9047295,36.5808826,4705m/data=!3m1!1e3> (Accessed 25 April, 2017).
- [12] Ledwith, A. (2014). *Zaatari The Instant City*. (online) Available at: <http://sigus.scripts.mit.edu/x/files/Zaatari/AHIPublication.pdf>.
- [13] Alshawawreh (2016). *Zaatari camp photos taken during a field visit by the author*.
- [14] Reach, (2013). *Zaatari camp wastewater assessment*. (online) Available at: <https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjOjlahi8LSAhVhJMAKHTjaAnAQFggaMAA&url=http%3A%2F%2Fdata.unhcr.org%2Fsyrianrefugees%2Fdownload.php%3Fid%3D4178&usq=AFQjCNHdBw0xKOKWKLs4PXm2aSj-WDoY5A&bvm=bv.148747831,d.d24>.
- [15] Alshawawreh, (2016). *Azraq camp photos taken during a field visit by the author*.
- [16] UNHCR, IFRC, and UN-HABITAT, (2014). *Shelter Projects 2013-2014*. 1st ed. (e-book) Available at: http://www.sheltercasestudies.org/shelterprojects2013-2014/Shelterprojects_2013-14_Lowres_WEB.pdf.
- [17] UNHCR, (2015). *T-Shelter for Azraq Refugee Camp (3D Diagrams)*. (online) Available at: <https://data2.unhcr.org/en/documents/details/46026>.
- [18] The Sphere Project. (2011). 3rd ed. *The Sphere Project*, pp.105-110.