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REFLECTION ON VERNACULAR ADAPTATION IN ZAATARI REFUGEES' CAMP SHELTERS

M.Sc. Thesis by

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M.SC. THESIS EXAMINATION RESULT FORM

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REFLECTION ON VERNACULAR ADAPTATION IN ZAATARI REFUGEES' CAMP SHELTERS

ABSTRACT

This thesis investigates the concept of vernacular adaptation of shelters in Zaatari Refugee Camp, Jordan, with the purpose of understanding how refugees had reshaped the standardized humanitarian shelters to meet their environmental, social, and cultural needs. Despite Zaatari's formal planning and infrastructure, shelter models have remained static since 2015. The research explores how residents have transformed these shelters over time by self-modifying and localized construction practices. To achieve this aim, the study had employed a qualitative methodology grounded in field observations, photographic analysis, and semi-structured interviews with camp residents. The data was analyzed through the lens of vernacular architecture theory to interpret how adaptation practices align with traditional spatial forms, construction methods, and community organization. A comparative case study with Azraq Refugee Camp, another Syrian displacement site in Jordan with a more rigid planning framework, was also conducted. Five criteria guided the selection of this case: shared displacement context, regional proximity, formal camp status, population scale, and institutional management. Findings reveal that in Zaatari, refugees have demonstrated high levels of autonomy and creativity in shelter adaptation, utilizing found materials, informal construction techniques, and spatial reorganization to improve comfort and restore cultural familiarity. In contrast, Azraq's strict governance model and modular shelter units have limited adaptation, leading to a weaker expression of vernacular practices. The research highlights how governance structures and design philosophies directly influence the extent to which displaced populations can reclaim agency in shaping their built environment. The study concludes by proposing a set of practical recommendations for humanitarian actors and policymakers. These include integrating vernacular principles into shelter design, supporting resident-led modification, and reconsidering camp planning strategies in light of long-term displacement. Future research may expand on this framework by including additional case studies from other regions and examining how these practices evolve during return or resettlement processes.

Keywords: Vernacular, Camps, Shelter, Adaptations.

ZAATARI MÜLTECİLERİNİN KAMP BARINAKLARINDA YEREL DİL UYUMUNA İLİŞKİN DÜŞÜNCELER

ÖZ

Bu tez, Ürdün'deki Zaatari Mülteci Kampı'nda barınakların yerel koşullara göre uyarlanması olgusunu incelemekte ve mültecilerin insani yardım kuruluşları tarafından standart olarak sunulan barınakları çevresel, sosyal ve kültürel ihtiyaçlarına göre nasıl dönüştürdüklerini anlamayı amaçlamaktadır. Zaatari Kampı'nın resmî planlaması ve altyapısına rağmen, barınak modelleri 2015 yılından bu yana sabit kalmıştır. Bu çalışma, kamp sakinlerinin zaman içinde bu barınakları nasıl dönüştürdüklerini; kendi başlarına yaptıkları değişiklikler ve yerelleşmiş inşaat uygulamaları üzerinden araştırmaktadır.

Bu amacı gerçekleştirmek üzere, araştırma; saha gözlemleri, fotoğraf analizi ve kamp sakinleriyle yapılan yarı yapılandırılmış mülakatlara dayanan nitel bir metodoloji benimsemiştir. Elde edilen veriler, yerel (vernaküler) mimari kuramı çerçevesinde analiz edilerek uyarlama pratiklerinin geleneksel mekânsal formlar, inşa yöntemleri ve toplumsal örgütlenmeyle nasıl örtüştüğü yorumlanmıştır. Ayrıca, daha katı bir planlama yapısına sahip olan ve Ürdün'de yer alan bir diğer Suriyeli mülteci yerleşimi olan Azrak Mülteci Kampı ile karşılaştırmalı bir vaka çalışması yürütülmüştür. Bu kampın seçilmesinde beş kriter esas alınmıştır: ortak bir yerinden edilme bağlamı, bölgesel yakınlık, resmî kamp statüsü, nüfus ölçeği ve kurumsal yönetim.

Araştırma bulguları, Zaatari'deki mültecilerin barınaklarını uyarlamada yüksek düzeyde özerklik ve yaratıcılık sergilediklerini ortaya koymaktadır. Sakinler, buldukları malzemeleri kullanarak, gayriresmî inşaat tekniklerine başvurarak ve mekânsal yeniden düzenlemelere giderek hem yaşam konforunu artırmış hem de kültürel aşinalığı yeniden inşa etmeye çalışmıştır. Buna karşın, Azrak Kampı'ndaki katı yönetim modeli ve modüler barınak birimleri, bu tür uyarlamaları kısıtlamış; yerel mimari pratiklerin daha zayıf biçimde ortaya çıkmasına yol açmıştır. Araştırma, yönetim yapılarının ve tasarım anlayışlarının, yerinden edilmiş toplulukların inşa edilmiş çevrelerini şekillendirme konusunda ne derece söz sahibi olabileceklerini doğrudan etkilediğini göstermektedir.

Çalışma, insani yardım aktörleri ve politika yapıcılar için birtakım pratik önerilerle sona ermektedir. Bu öneriler arasında yerel mimari ilkelerin barınak tasarımına entegre

edilmesi, sakinler öncülüğünde yapılan değişikliklerin desteklenmesi ve uzun süreli yerinden edilme durumu göz önünde bulundurularak kamp planlaması stratejilerinin yeniden değerlendirilmesi yer almaktadır. Gelecekteki araştırmalar, bu çerçeveyi diğer bölgelerden alınacak ek vaka çalışmalarıyla genişletebilir ve söz konusu pratiklerin geri dönüş veya yeniden yerleşim süreçlerinde nasıl evrildiğini inceleyebilir.

Anahtar Kelimeler: Yerel, Kamplar, Barınak, Uyarlamalar

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NOMENCLATURE

ACRONYMS

AC Air Conditioner.

BOQ Bills Of Quantities.

MEAN Middle East and North Africa.

NGO Non-Governmental Organization.

SARD Syrian Refugee Affairs Directorate

UN United Nations.

UNDP United Nations Development Program.

UNHCR United Nations High Commissioner for Refugees.

WASH Water, Sanitation, and Hygiene.

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CHAPTER 1

INTRODUCTION

Zaatari camp is located in the northern side of Jordan, near the Syrian border (around 32km) as seen in Figure 1.1. Under the joint management of UNHCR and Jordanian governmental authority; the Syrian Refugee Affairs Directorate (SRAD). As of December 2024, the population count in the camp was around 76,000 individuals. With 32 schools, 6 health clinics, 41 community centers, 25,000 shelter units with full operating water and sanitation infrastructure systems and an electrical network provided through a solar power system [1] .



Figure 1.1 Jordan map showing Mafraq and Zaatari camp location**.**

The infrastructure systems constructed, with clear master plan and organized, verify the development of this camp compared to hosting communities Figure 1.2. [2]

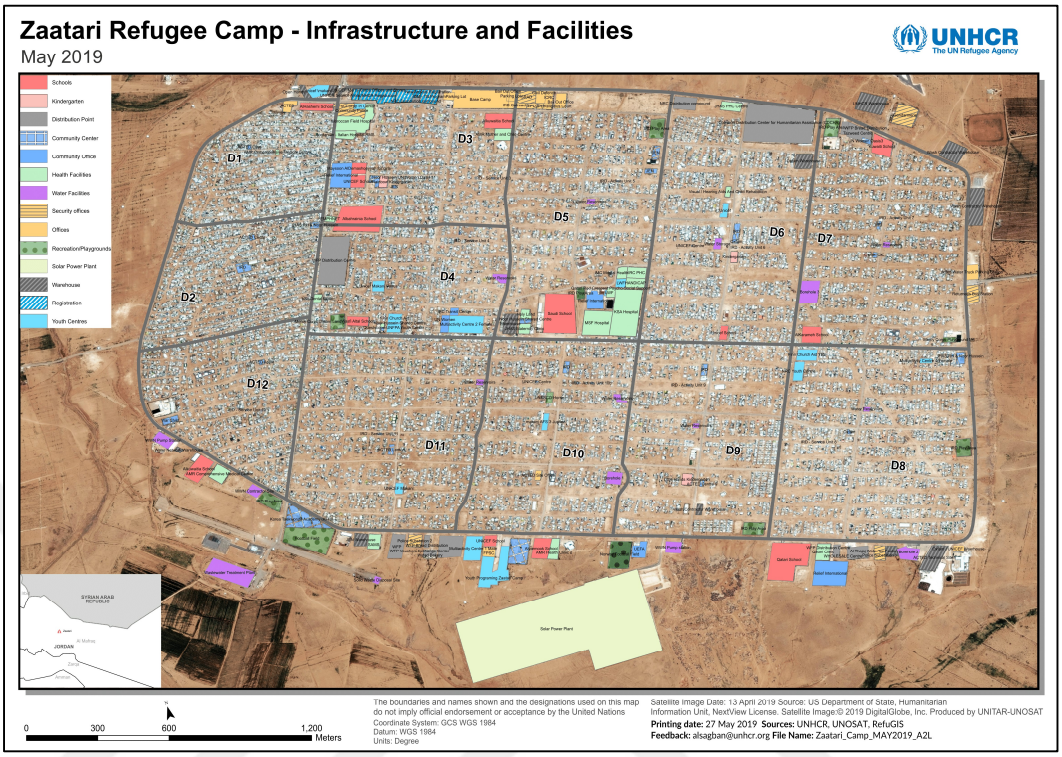


Figure 1.2 Zaatari refugee camp Map [3]

Zaatari refugee camp had been developed over the past 10 years at all infrastructure levels. The urban environment considered advanced compared to the surrounding host communities and to other camps around the world. But for different reasons, the current shelter quality remained still at the same level since 2015.

The word vernacular originates from the Latin word ‘vernaculus’ meaning native. This underpins the general modern understanding, which is ‘‘architecture built of local materials, to suit local needs, usually of unknown authorship and making little reference to the chief styles or theories of architecture.’’[4]

Shelters in Zaatari are prefabricated units with a built-in private facility Figure 1.3 (UNHCR, 2021a). Being maintained by shelter actors and coordinated between different NGOs by UNHCR.



Figure 1.3 Prefab unit layout.[7]

After almost 10 years of the camp establishment, the shelters provided are still considered as temporary solution, although exceeding the age of usage for this type of shelter [6].

Residents in Zaatari camp had changed the provided shelter standard's layout Figure 1.4 to make it more personalized and acceptable which includes, location, orientation and adding more units (financed privately) laid out in a way that forms courtyards (Personal communication, 2015-2018)[1].

[1] Based on personal observation while working in the camp 2015-2018.



Figure 1.4 Personalized Shelter adaptation by refugees.[7]

The camp still lack regulations regarding shelters. The international standards are clear about the layout of the camp guidelines, but not about the shelter's construction or design. The only measurable guideline is the 3.5m area per individual (Sphere Association, 2018), the other guidance notes can be interpreted differently from person to person. Same applies to the regulations from local government, non is written and nor have been documented for the sake of the agencies operating and for the refugees to know exactly what they can and can't do regarding the shelters [8]. It's a matter of trial and error, you make a change in the shelter structure, if it's noticed and is not accepted by the local authority, it will be destroyed. (Personal communication, 2015-2018) and you know your limit.

A simple standardized shelter can provide the basic need for short term, after the first stage of displacement refugees should have autonomy over their home, a sense of belonging can be only reached when personalization is implemented. Although recent research about a Participatory design in Zaatari camp [8] conclude that Participatory design approach can increase the satisfaction of refugees, maybe this can be generalized when comparing having minor opinion to no opinion at all. But when it comes to personal properties, the only opinion should be to the residents. Participatory design should be done on public shared spaces, and in regulation and legalization of the sheltering process. and perhaps the main support needed after legalization is the support to emerge in the local construction market and the way things are done to increase their capacities to be able to make their own choices.

1.1 Statement of the Problem

Since January 2015, the primary shelter solution in Zaatari Refugees' Camp has been prefabricated units with concrete flooring [9]. Although being a practical initial response at the beginning of the crisis, the latest fact sheet from June 2021 [5] reveals that the shelter materials and conditions remain unchanged. This stagnation over six years reflects limitations in funding and policy flexibility, which have prevented the transition from emergencies to more durable shelter. As a result, the current shelter conditions are inadequate for long-term living, especially considering that refugee camps were initially intended as temporary settlements.. In addition, the enforced standardized urban layout, designed for ease of management during the duration of the camp's establishment period, had not succeeded in considering the evolving environmental, social, and cultural needs of its residents. This has resulted in a mismatch between the standardized approach and the dynamic, long-term realities of life in the camp. The current situation highlights the need to reassess and adapt shelter solutions and regulations to better serve the needs of the refugee population.

1.2 Aim of research

The research aims to document and learn from residents' adaptation practices and solutions to inform future reconstruction efforts for returnees.

1.3 Objective of the research

- To document and analyze the adaptive methods and solutions developed by camp residents to address their living conditions and the surrounding environment needs.
- To understand how these adaptations respond to social, environmental, cultural, and economic needs.

1.4 Importance of Research

Although some Syrian refugees have begun returning in the past few months due to the fall of Assad regime, a significant number still reside in Zaatari Refugee Camp. While the camp enters its second decade, many shelters continue to serve as de facto permanent

homes, despite being designed for temporary use. This research highlights the need to learn from the adaptations strategies that residents have developed over the years. By capturing these practices, the study contributes to the ongoing conversations among humanitarian actors and policymakers about how to support both current camp populations and future returnees through more sustainable and context-sensitive shelter solutions.

1.5 Limitation of the study

This study primarily focuses on documenting and analyzing the general adaptations made to shelters by the camp residents, rather than proposing ideal or definitive shelter solutions for camp management and residents. The following limitations may impact on the scope and depth of the research:

- Access Challenges: Obtaining permission to enter the camp involves navigating a lengthy and complex bureaucratic process, which could delay or restrict access.
- Limited Access to Private Shelters: Gaining access to multiple private shelters within the camp may be constrained by privacy concerns or logistical challenges.
- Restricted Field Visits: Field visits are limited to specific, government-authorized tours, which are typically restricted to daylight hours. Consequently, the research may not fully capture the adaptations and dynamics of evening or nighttime life in the camp.

1.6 Methodology

This research will use a qualitative, exploratory approach to analyze shelter adaptations in Zaatari Refugees Camp. In addition, it incorporates a comparative case study methodology, investigating other regional camps that have seen physical shelter improvements.

1.6.1 Research Design

The study adopts a case study methodology to explore the specific context of Zaatari Refugees' Camp. This approach allows for an in-depth investigation of the social,

cultural, environmental, and economic dimensions of vernacular adaptations made by the camp's residents.

1.6.2 Data Collection Methods

1.6.2.1 Primary Data

- Field Observations: field visits to observe shelter adaptations in the camp. Observations will focus on detecting physical modifications, spatial arrangements, and materials used by residents to adapt to their environment.

1.6.2.2 Secondary Data

- Literature Review: Analysis of existing reports, academic articles, and organizational documents on Zaatari Refugees' Camp, vernacular adaptation, and shelter planning in humanitarian contexts.
- Operational Documents: Reviewing documents, policies and guidelines from government agencies and humanitarian organizations to understand the camp, and the regulations influencing shelter and urban design in the camp.
- Photographic and Visual Documentation: Relying on public and private images and videos of shelter modifications and layouts to feed the qualitative analysis.
- Comparative Case Study Data: Identifying camps in the region that have s similar adaptation processes, such as:
    - Long-standing Palestinian camps (e.g., Al-Baqa'a Camp, Lebanon's Shatila Camp).
    - Other camps in the Middle East or North Africa where adaptation efforts were complemented by formal rehabilitation or urban improvement projects.
- Collecting data on successful practices, challenges, and outcomes of these efforts.

1.6.3 Comparative Case Study

- Selection of Comparative Cases, the comparative cases will focus on camps that:
    - Have faced prolonged displacement scenarios similar to Zaatari.
    - Refugees' camps. Not IDPs.

  - Have evidence of both resident-driven adaptations and institutional or community-led rehabilitation projects.
  - Camps that had been established within the country itself or in another country.
- Focus Areas for Comparison:
  - Shelter solution used for improvement.
  - Incorporation of social, cultural, and environmental aspects in shelter improvements.
  - The impact of adaptation work on the well-being of residents.
  - Cooperative work between residents, local communities, and humanitarian organizations.

1.6.4 Sampling

Purposive sampling will be used to select interviewers and shelter s within Zaatari camp that demonstrate several adaptations techniques. This to ensure that the observations and documentation capture a diverse range of practices and conditions.

1.6.5 Data Analysis

- Thematic Analysis: Qualitative data from discussions with residents or related stakeholders and observations will be analyzed to identify recurring themes and patterns related to vernacular adaptations. In addition to the field observations and interviews, this research incorporated photographic analysis to document and analyze shelter adaptations. A descriptive visual analysis approach will be used to examine the physical modifications seen in shelters and their surroundings.
- Comparative Analysis:
  - A cross-case analysis will be conducted to identify similarities and differences in adaptation strategies across Zaatari and comparative camps.
  - Insights will focus on transferable and scalable solutions applicable to Zaatari's context.
- Strategic Framework Development: Drawing from both Zaatari and comparative case studies, the analysis will inform a practical framework for enhancing shelter

design and urban planning for humanitarian actors, government entities, and local communities.

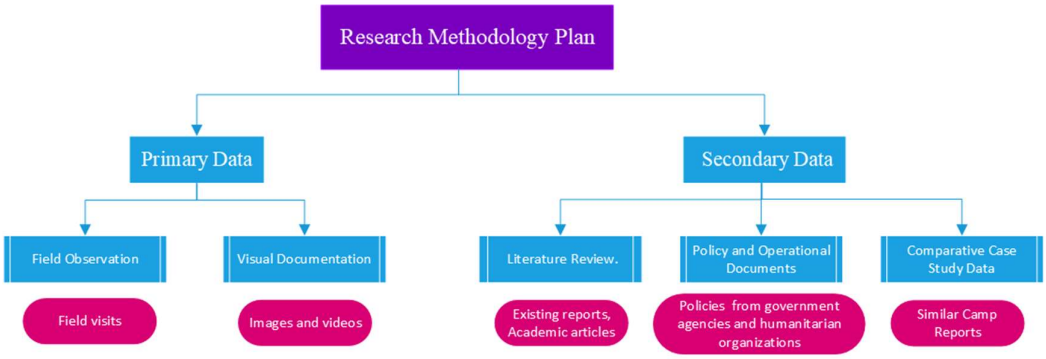


Figure 1.5 Research Methodology Plan

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CHAPTER 2

THEORETICAL FRAMEWORK

2.1 Vernacular Architecture Theory

Vernacular architecture refers to building traditions that have evolved in response to specific contexts [10]. By not following standardized or globalized design norms, it reflects the lived experiences, practical needs, and collective knowledge of communities over time [11].

One of the main characteristics of vernacular architecture is climate **responsiveness**. Traditional architectural structures were designed to adapt to the local environmental conditions, usually using passive cooling and heating techniques to maintain indoor comfort [12]. Buildings in hot and arid climates had thick earthen walls that provide high thermal mass, absorbing heat during the day and releasing it at night [13]. In contrast, in tropical regions, such as central and eastern part of the Indonesian island, Javanese houses are specifically designed for the tropical climate, with features such as elevated structures and central courtyards that help manage flooding and improve ventilation. with features like overhanging roofs and thick walls, demonstrates climate responsive architecture that reduces heat gain and provides shade [14] . These design strategies minimize the reliance on mechanical cooling and heating systems, making vernacular architecture naturally energy efficient and environmentally sustainable.

Another feature of vernacular architecture is the use of **locally available materials**, the use of climate-adapted and durable materials, [11] . The selection of building materials is directed by availability, climate appropriateness, and cultural practices. One of the key articles highlights the importance of traditional design practices using locally available materials and their sustainability within rural and urban communities which reduces the carbon footprint associated with transportation and production [15]. In many cases, especially during the pre-industrial era, vernacular houses are built by their owners with uncomplicated construction techniques, it is a source to simple sustainable solutions with significant environment-friendly features such as providing human comfort using low

energy techniques, which rely on community participation and not on mechanized processes [16]. This results in architecture that is well-integrated into the natural surroundings and capable of being repaired or upgraded with locally available resources.

Cultural identity is another important characteristic of vernacular architecture. Traditional buildings were highly influenced by social structures, religious beliefs, and local norms that are produced by non-expert "ordinary people" through knowledge transmitted and enriched over time from one generation to the next [11], ensuring that architectural spaces would align with cultural values and community needs. The spatial organization of the vernacular structures usually reflects traditional family structures and social hierarchies. For instance, in many societies, homes are designed with separate areas for public and private life, that would ensure privacy but at the same time would maintain the communal gathering spaces, the significance of the alignment of openings and transition spaces and the play with levels to further establish interval all could be employed to adapt to the social and cultural needs [17]. The architectural elements like courtyards, verandas, and decorative facades often carried symbolic and aesthetic significance, that would reinforce cultural identity and heritage continuity, unlike modern architecture, which usually prioritize universal design principles, vernacular buildings evolve organically to meet the specific needs of the inhabitants.

A key characteristic of vernacular architecture is its **flexibility and incremental growth**. Incremental housing is a strategy based on a progressive system, where construction is described as incomplete but in habitability conditions; they change and evolve over time as families expand, economic conditions change, or environmental conditions demand it. Many of these homes are built in stages, which would allow for modifications and extensions when needed rather than sticking to a rigid plan or layout which was designed at earlier phase. This kind of flexibility ensures that buildings stay functional and relevant across generations, which would allow the occupants to expand homes, adjust layouts, or introduce new building materials as resources and technologies evolve [18]

Vernacular architecture represents a homogeneous integration of climate adaptability, using sustainable materials, reflecting cultural traditions, and ensuring structural flexibility. Unlike standardized modern architectural approaches, which usually have rigid design frameworks, vernacular buildings emerge organically through an **interaction**

between people, place, and available resources. This adaptability ensures that structures remain functional, durable, and culturally relevant, which would make vernacular principles a timeless and valuable approach to sustainable architecture. Understanding these principles is essential to understand how traditional knowledge and building techniques can inform temporary architectural solutions and practices.

2.2 Humanitarian Architecture

This section investigates the concept of Humanitarian Architecture, its core principles, and the challenges faced in refugee settlements/camps. The discussion highlights recent research (2020-present) to provide an updated understanding of how shelter design in displacement contexts developed.

Human center design, is a concept that delves into the intersection of humanitarian action and urban development which focuses on designing and constructing spaces that address **urgent** human needs, mainly for the displaced populations, disaster-affected communities, and those who are living in extreme poverty [19]. Unlike ordinary architecture, Emergency Shelters are quick to build (which is in line with the UNHCR Shelter Design Catalogue) but fail in other aspects of design, such as comfort, sustainability, safety & access. [20]. It's been clearly mentioned in the Sphere standards, to respect existing practices and customs and how these affect the need for internal subdivisions (curtains, walls)[21].

2.3 Conceptual Linkage Between Vernacular and Humanitarian Architecture

The connection between vernacular and humanitarian architecture is a rich area of research though it's still not widely explored. both approaches respond to basic human needs, such as safety, shelter, and cultural identity, under conditions of restriction. But each begins from different starting points, vernacular architecture is rooted in generations of local knowledge, while humanitarian architecture is typically the product of rapid response for externally driven interventions and designed in response to emergencies, displacement, or conflict.

Vernacular architecture is naturally adaptive, as it uses local materials, responds to surrounding climate conditions, and reflects neighborhood cultural practices. It is connected to its place and tradition, often developed gradually over a long period through trial and error and the local know-how. On the other hand, Humanitarian architecture is focused on speed, scalability, and cost, frequently using prefabricated, modular systems that have international standards[22]. While these quick solutions are sometimes necessary in emergencies, they can unintentionally overlook the social, cultural, and environmental needs of the communities they meant to help.

Even though vernacular principles have a lot to offer in humanitarian settings, especially after disasters or refugee environments, there is a clear lack of academic research that clearly shows the link between vernacular and humanitarian spaces. Studies keep vernacular and humanitarian architecture as two separate topics, with only a few critical explorations of how vernacular knowledge could improve humanitarian architecture. In research focused on refugee camps or transitional shelters, mentions of vernacular adaptation are briefly mentioned, as opposed to being the focus of the shelter response theory.

This lack of clear integrated theory is a main gap within literature. Although a few scholars have touched on related ideas, for example, self-constructed shelters, informal settlements, or culturally sensitive designs, there is no detailed scholarly framework that seriously explores how vernacular architecture should be integrated into humanitarian architectural practices. A few case studies, such as, Pakistan Flood Relief [23], the Echo villages in Pakistan project [24]) offer some real-world examples, but there is no strong, well-developed body of research that connects them.

Further supporting how applicable vernacular strategies for humanitarian situations, the United Nations Development Program (UNDP) has openly supported the inclusion of vernacular architecture as a key part of post crisis reconstruction and transitional housing planning[2]. On their official website, UNDP is calling for vernacular architecture as a key part of culturally adapted, resilient, and environmentally friendly housing during the reconstruction phase, specifically for areas of conflict or disaster, like Afghanistan [25].

[2] The project mentioned is not within a camp context.

They emphasize that vernacular building not only aligns well with the preferences of the locals as well as existing knowledge, but it also enhances the community's ownership as well as long-term sustainability. A project in eastern Afghanistan shows this in action, where communities impacted by earthquake destruction worked with UNDP on rebuilding their communities using traditional building techniques and materials. This example shows how vernacular practices which are deeply ingrained in the country's culture for centuries, offer sustainability and resilience can successfully be brought back into use for transitional shelters, preserving cultural heritage while also improving safety and durability [26].

These case studies show that when humanitarian architecture thoughtfully includes elements of vernacular design whether through materials, layout, or building methods, it can offer more than just physical strength [27]. It also helps restore human dignity, ownership and a sense of cultural identity. However, such initiatives are still scattered and usually are led by individual architects or NGOs, as opposed to being integrated within institutional humanitarian strategies. This highlights the gap of both, the policy and practice, one that this thesis aims to explore further, especially in the context of Zaatari Camp, where any vernacular adaptations tend to happen informally, not as part of a planned design approach.

One of the few exceptions is the work by A. Elliott, titled The Role of the Vernacular within Displacement Architecture [28] , Which directly explored various understandings of the vernacular within some of the most isolated urban environments and how displaced populations adapt their spatial environments through culturally familiar architectural forms and layouts. This study connects the vernacular design principles to humanitarian spatial contexts, specifically within refugee camps like Zaatari, and thus serves as a first step for the present research.

A related concept that has gained attention in recent research is "vernacular humanitarianism", which is a term that refers to aid provided by various local actors in tune with their socio-historically specific ideas of humanness [29], and used to describe local, culturally rooted, and informal forms of aid that operate outside of institutional humanitarian frameworks. Rather than referring to architecture or the built environment, this concept highlights grassroots forms of care and assistance that are often less visible

and less dominant than state or NGO-led efforts. As scholars writing for Allegra Lab emphasize[27, 28], vernacular humanitarianisms emerge through the actions of ordinary people and communities, shaped by local histories, moral frameworks, and socio-cultural values that differ significantly from the logics of international humanitarian organizations.

Although the term offers a valuable lens for understanding bottom-up responses to crisis, it is not concerned with architecture or spatial design. Its usage in scholarship has remained within the realms of social anthropology, political science, and development studies, pointing to a broader gap in literature where vernacular ideas have yet to be explored through an architectural lens, particularly in the context of temporary or emergency settlements.

2.3.1 Theoretical Perspectives on Vernacular Adaptation

Several architectural and social theories help contextualize refugee-led vernacular adaptation:

- **Climate-Responsive Vernacularism** [19]: Highlights how vernacular shelters are inherently climate-adaptive, utilizing passive cooling and natural ventilation.
- **Participatory Adaptation** [8]: the researchers found that participants were more resourceful and better able to translate their ideas, thus resulting in a more informative process, when they were presented with an initial design or concept to work with.
- **Incremental Shelter Transformation** [30]: Argues that emergency shelter designs are not planned as permanent solutions, thus they develop.

By applying these perspectives, we can analyze Zaatari not just as a refugee camp, but as a vernacular settlement in its own right, shaped by bottom-up adaptation processes rather than solely humanitarian planning.

2.4 Application to Zaatari Refugees' Camp

2.4.1 Vernacular Adaptation in Forced Displacement Contexts

Refugee settlements often begin as standardized, temporary shelters, designed for rapid deployment rather than long-term habitation. However, in protracted displacement situations like Zaatari Refugee Camp, residents gradually transform these spaces into more permanent, livable environments. This adaptation aligns with vernacular architecture principles, where communities modify their built environment to reflect climatic, material, and cultural needs.

Similar to other refugee Camps, where inhabitants have altered their prefabricated shelters in the following ways:

- Material Adaptation: Refugees reinforce temporary structures using concrete blocks, bricks, and insulation materials to improve durability [31].
- Spatial Reorganization: Residents reconfigure shelters to create courtyards, communal areas, and economic spaces, replicating traditional housing layouts [32].
- Environmental Strategies: Shading structures, water collection systems, and thermal insulation techniques are integrated to mitigate extreme weather conditions [33].

These adaptation strategies mirror vernacular architecture principles, despite occurring within a humanitarian governance framework [34].

2.5 Summary and Relevance to Zaatari Camp

In this chapter, the conceptual and actual intersections between vernacular architecture and humanitarian architecture have been examined, as well as the lack of integrated scholarly paradigms that link the two. Although brief mentions of their intersection exist, notably through the lens of displacement and post-crisis reconstruction, the scholarship is scattered and underdeveloped. The Zaatari Refugee Camp presents a powerful

illustration of how displaced communities adapt vernacularly in a humanitarian environment. Refugees within Zaatari have demonstrated impressive:

- Ingenuity, through repurpose, adapting, and reassembling standard-issue shelters made from salvaged, repurposed, or retrieved materials.
- Climate responsiveness, by means of passive cooling methods including shading, layering of insulation, and orienting towards coping with hot temperatures.
- Cultural continuity through redefining spaces in a manner that replicates Arab courtyard housing as well as sustains customary forms of social organization.

These adaptive actions highlight the value of vernacular principles not only for maintaining physical housing, but for saving identity, dignity, and resilience within displacement situations. They call for an urgent need for culturally and environmentally sensitive humanitarian design that acknowledges refugees as not just passive receivers of assistance, but as agentic actors of spatial change.

The literature revised for this chapter had flagged an important point on the limited and fragmented connections between vernacular and humanitarian architecture. Although there is a growing recognition of the connection between both, most studies still treat these two subjects separately, lacking a cohesive framework that integrates vernacular architectural knowledge into humanitarian shelter designs. However, there are few case studies and multiple references that highlight the adaptive solutions of displaced populations, strategies that fully align with the vernacular architectural principles but are not acknowledged as such.

CHAPTER 3

ADAPTATIONS OF SHELTERS IN ZAATARI REFUGEES' CAMP

This chapter offers a sequence of on-site-based documentation of how residents of Zaatari Refugees' Camp have adapted the surrounding environment, and the shelters they occupy over time. Through photographic documentation, observations from direct on-site visits, and secondary documentation practices, the following sections discuss how the practices of daily living have influenced and reshaped the constructed environment. Without applying a formal theoretical framework, the focus remains on describing reflections that will highlight the spontaneous/natural adaptations carried out by camp's residents. These observations provide a view into how displaced populations respond creatively and organically to environmental, social, and cultural demands through casual modifications of private and communal spaces. These reflections will highlight how vernacular architecture develops not through academic design, but through experiences that are shaped by available materials, cultural habits, and practical requirement for day to day living, all of this to response to the standardized shelter models used in refugee camps which often fail to address long-term adaptability needs of displaced communities[35]. The modifications observed in Zaatari reflect many of the core qualities of vernacular architecture: adaptability, resource efficiency, and user-driven spatial organization.

3.1 Personalizing the Humanitarian Template, Early Steps.

From the very early stages of Zaatari Camp's establishment, refugees started to personalize and adapt their emergency shelters (the standard UNHCR tents) to meet with their cultural and social needs. In the photograph below Figure 3.1, a simple but meaningful change can be seen; the resident of the tent has lined a row of concrete blocks outside the tent to define a semi-public space. This small action demonstrates the residents' early efforts to rebuild familiar spatial orders, establishing boundaries between private and communal areas even within the temporary and fluid conditions of a new settlement which is considered a usual practice in vernacular architecture for certain societies.



Figure 3.1 Zaatari Camp 2012 [36]

Another temprory change that was applied to the emergnecy tent can be seen in the photo below Figure 3.2, the refugee is emphesizing on their privacy by using the mattress to form a temprory barrier between the inside and the outisde, privacy and segregation between private and public is a key important aspect for Syrian culture. This could be used to increase protection from sand, dust and wind.



Figure 3.2 Zaatari Camp 2012 [37]

In later stages of Zaatari Camp's development, when prefabricated caravans were distributed to replace tents, residents showed a notable well to adapt and combine different types of shelters. The photograph below - Figure 3.3 - shows how refugees repurposed the previously distributed UNHCR tents along the newly provided caravans to create extended living rooms. By attaching part of the tent sheets to the caravan, refugees efficiently expanded their sheltered area, creating interim zones that blurred the borders between indoor and outdoor life.



Figure 3.3 Zaatari Camp - Modified Shelters[38]

3.2 Locally Sourced Change, and Cultural Continuity.

It is important to highlight that refugees in Zaatari Camp were not formally allowed to use permanent construction materials [32], such as cement, stone, or mud bricks for building their private structures. Although this constraint was never officially stated by the government, it was commonly known and applied within the camp. Before this informal constraint became known, many refugees experimented with constructing walls and structural elements using the materials available in their surrounding environment, especially sand Figure 3.4. These early trials to make mud bricks and build with earthen materials raise as further proof that architectural knowledge and building skills are genuinely embedded in people lived experiences. In fact, mud construction has been known as a vernacular technique in the region [39], especially before cement became

widely common. However, all these permanent built structures were demolished by camp authorities, as they were seen as a symbolic and a step toward permanency, something that was against the temporary nature of the camp's official mandate.



Figure 3.4 A photo taken in 2016 for one of the trials of building mud bricks in the camp.



Figure 3.5 Shelter Unit in Zaatari Camp[3]

This photograph above Figure 3.5, taken during my fieldwork at Zaatari Camp in early 2016, captures an important example of how residents adapted their living environments. The shelter unit shown above is one of the standard shelters distributed by camp management agencies during 2015 [40], it is a basic, prefabricated structure intended for immediate, short-term needs during emergencies. Remarkably, within a span of no more than six months, the residents had already transformed and personalized the space to better accommodate daily life. Drawing on recycled wood, scrap metal, and remaining wiring, the resident built a makeshift door and a fence for the outdoor area. Although informal and improvised, this intervention reflects key vernacular practices: using available materials, construction flexibility, and allowing living spaces to evolve gradually.

The formation of a fence goes beyond practicality; it corresponds to a cultural necessity to define private boundaries and establish a sense of ownership and individuality after displacement. By expanding the limits of the allocated plot, the residents managed to create an outdoor area which is a critical aspect of everyday life, especially for those

[3] Based on personal observation while working in the camp 2015-2018

coming from rural areas, where yards and outdoor spaces form the heart of domestic and social activities[41].

In addition, in the left side of the photograph, we can note a construction of a small water feature or a fountain, which is an element deeply rooted in Syrian culture[42]. Even in its early form, the presence of this feature shows the residents' wish to create known spaces and install familiar elements from their lives before displacement. It shows that cultural traditions continue even when displaced and in tough conditions, and that these physical modifications meet not just practical needs, but also emotional and symbolic ones.

Another strong example of refugees increasing the use of available local materials was observed in 2016. When the camp agencies deconstructed the public communal WASH facilities to replace them with private units, refugees instantly reclaimed the rubble from the demolished structures and repurposed it to create private elements within their own plots. Figure 3.6 & Figure 3.7 (Both figures were taken during field work in the camp 2015-2018, and the constructed wall in the 2nd figure was demolished by authorities).



Figure 3.6 Water Tank Base.



Figure 3.7 Creating Walls from demolished public facilities**.**

3.3 Forms and Layout Adaptations.

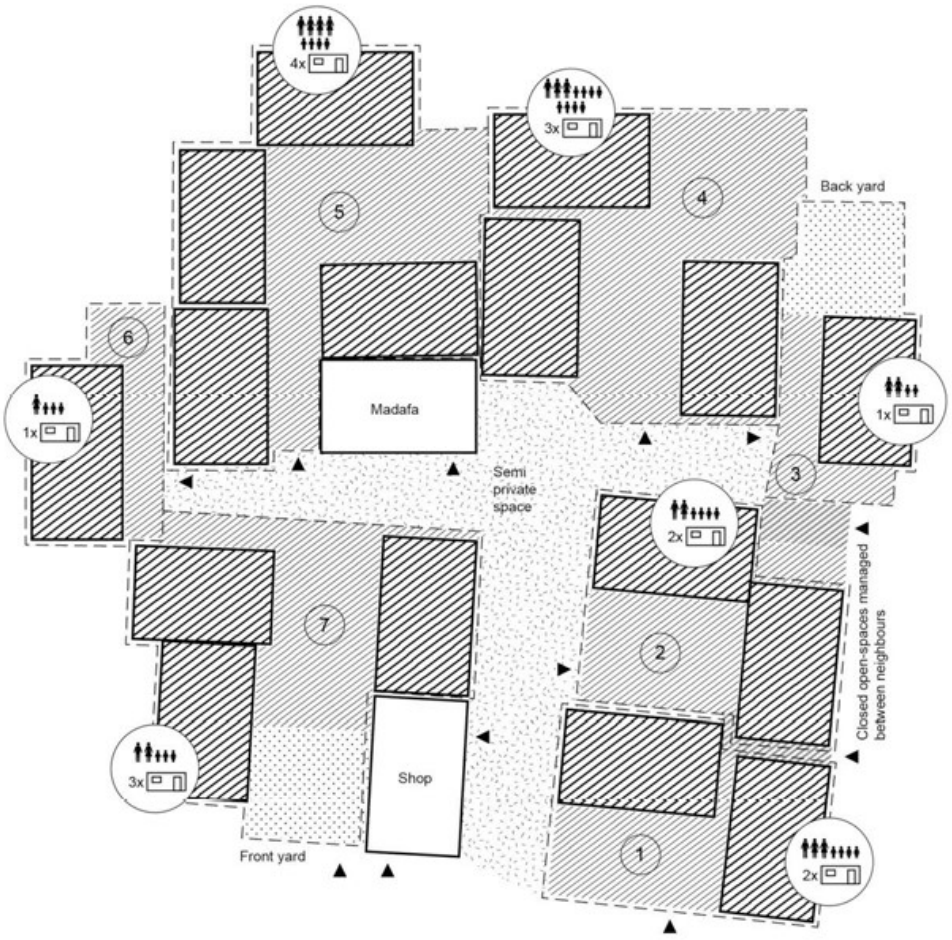
In Zaatari Camp, the spatial layout of shelters reflects more than just functional suitability or availability of space, it was re-shaped by cultural principles, especially the value of extended family ties. Although originally the caravans were positioned on a grid form to ease the management of the site. The residents repositioned their caravans to meet their needs. This section examines how cultural patterns influence shelter grouping, relying first on secondary data, then reflecting on a specific case documented during field visits in 2016 and revisited in 2025.

3.3.1 Clustering and Social Ties.

The observed spatial patterns seen in the Zaatari camp include clustered housing arrangements, fenced-in clusters, centralized space configurations, and modular layouts that integrate indoor and outdoor areas. These patterns were formed to reflect both functional requirements and cultural influences on spatial design.

In the book From Shelter to Dwellings [32], the writer documented a case of one of the camp residents-Sami; the case of Sami and his extended family provides a concrete example of how spatial choices are made not only depending on needs but also depending on cultural values and norms.in the case of Sami, originally he was not located next to his family when arrived to the camp, Sami decided to move in order to settle next to his relatives from As-Sawara, yet remaining within the ‘old camp’ area. As seen in Figure

3.8 the family had clustered their shelters close to each other, maintaining social closeness. Orientation decisions such as inward-facing entrances and communal courtyards emphasized this collective lifestyle, turning individual shelters into an organized family compound.



House number	Family members	Number of containers	Relationship between dwellers	Relation to Abu Muhammad
1	7	2	Extended family: parents, 4 children and an aunt	Aunt and her relatives (*khale*)
2	6	2	Single family: parents and 4 children (Abu Muhammad)	Abu Muhammad (reference persont)
3	4	1	Single family: parents and two kids	First cousin (*Ibn 'Amm*)
4	11	3	Extended family: parents with their mother and 8 children (Abu Nasser – son of the Mukhtar)	First cousin (*Ibn 'Amm*)
5	8	4	Extended family: parents with 4 children and two aunts	Distant cousin of the mother (Ibn 'Amm el Walde)
6	4	1	Single family: widow with 3 children	No direct relation (from the family)
7	5	3	Single family: parents with 3 children	First cousin (*Ibn Khale*)

Figure 3.8 A diagram showing the familial arrangements within the cluster and the relationship between the dwellers (the case of Sami)[32]

This pattern is not unusual. In other parts of the camp, similar clustering reflects rural traditions from before displacement, where homes were built around shared open spaces used for daily tasks and social gatherings and the formed compounds shaped as the family

expands [43]. These arrangements show how residents actively shape their surroundings based on familiar cultural practices, even within the challenges and constraints of the displacement [41].

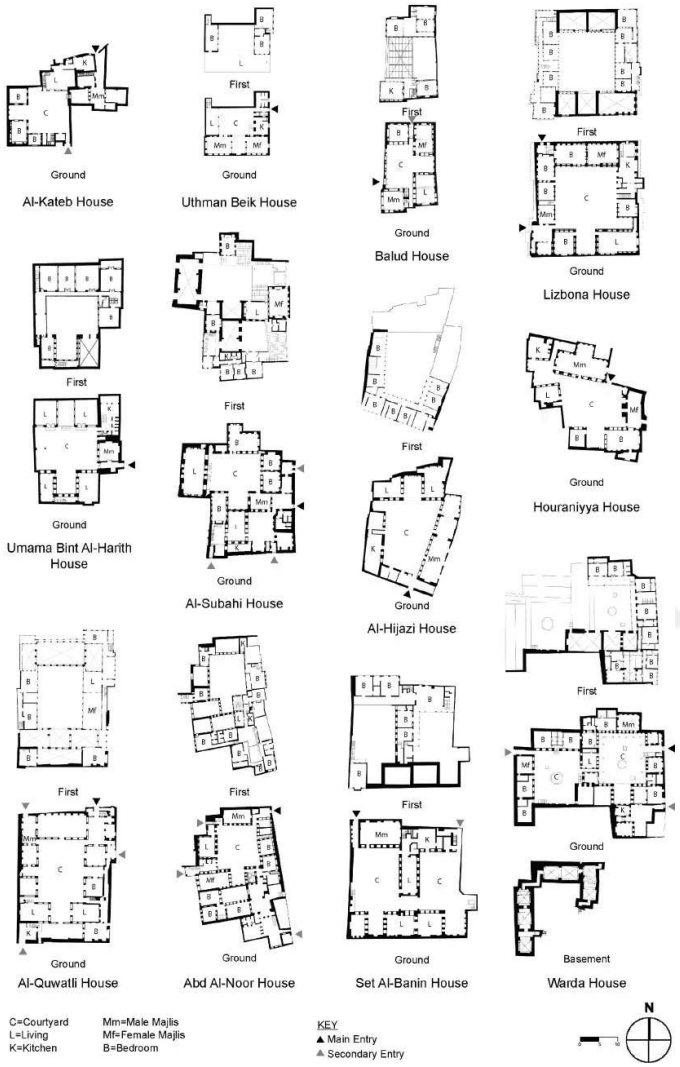


Figure 3.9 Floor plans of different Syrian Courtyard houses, showing the similarity with Sami's family cluster[44]

Beyond the architectural adaptations made at the household and family level, it is very important to spot how pre-existing social structures and cultural norms – especially the role of the Mukhtar (community leader) and the practice of maintaining Madafas (guest spaces or communal reception areas)- also formed the physical layout of Zaatari Camp.

In the book From Shelter to Dwelling [32], the author mentions an example where the son of a former Mukhtar added an extra caravan in the camp, and within the cluster, he tried to maintain this role by keeping one of the caravans open as a guest house for men from the same village, where they would meet regularly to talk and to enjoy food together. This was not only about having additional living space, but it was also a continuation of leadership responsibilities and social recognition embedded in the pre-displacement traditions. Likewise, the practice of creating clusters around extended families or tribes continued in Zaatari. Refugees intentionally recreated the spatial logic of their original communities, forming clusters with having one caravan designated as a Madafa, a reception and assembly area for visitors or family meetings. These examples proof that vernacular practices of spatial organization are only architectural but also embedded in systems of social structures, which continue and adapt even under conditions of forced displacement.

3.3.2 Incremental Transformation of a Shelter Unit: 2016–2025

In another case, that was documented first in 2016 Figure 3.11 and revisited in 2025 Figure 3.12, presents a convincing example of how shelter structures in Zaatari Camp have developed through dweller-driven adaptation. In 2016, the household was composed of two prefabricated caravans positioned opposite each other Figure 3.10 , with a roofed space formed in between common areas. Another open patio located next to the main entrance which created a spatial layer to the shelter. The layout was purposely oriented to avoid a direct visual connection from the street into the private sections of the home, showing a culturally rooted emphasis on maintaining household privacy.

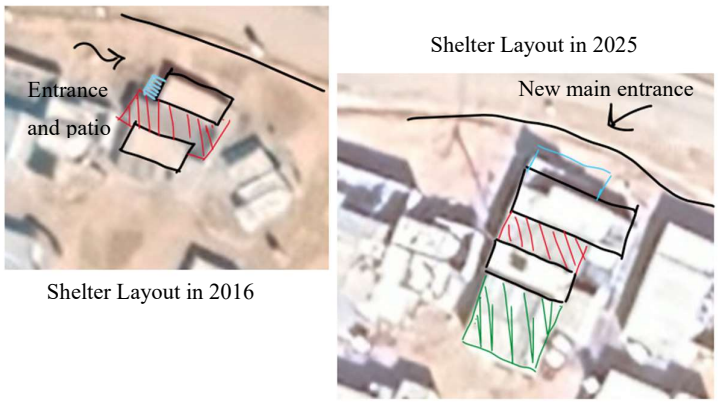


Figure 3.10 Photo of the shelter taken from google maps, in 2016 & 2025

By 2025, the household had gone through major changes. The family added new shelter units, increasing both the amount of indoor space and the overall layout complexity. A new entrance was opened facing the main street for easier access, while the original entrance was closed. Instead of removing the old entry area, the family turned it into part of the main living space, blending it into the daily use of the home. At the same time, they built a new patio next to the new entrance, once again creating a space that separates public and private life. Keeping the original patio along with building new transition areas shows a mix of continuity and adaptation. This example shows how residents gradually change not just the size of their homes, but also how they are arranged and accessed, shaping living spaces that meet every day needs while staying connected to cultural traditions.



Figure 3.11 Photo of the shelter taken in 2016.



Figure 3.12 Photo of the shelter taken in 2025.

3.4 Environmental Adaptations

The surrounding environment have played a key role in determining how refugees adapt their shelters within Zaatari Camp. With harsh climate conditions, hot summers, cold winters, and common dust storms, refugees had to find creative and basic solutions to make their living spaces more comfortable and resilient. Although those solutions were improvised and unregulated, they reflect a sensitivity to the surrounding environment and echo traditional approaches used in vernacular architecture within the region.

As discussed in previous sections, refugees rearranged the layout of their shelter units into informal clusters, to tackle privacy concerns and be closer to their extended families which was similar to the spatial arrangements rooted in their cultural customs. However, these clusters also served an important environmental role. By arranging caravans close to each other (around a shared courtyard, shared pathway or semi-enclosed space) residents created microclimates that enhanced thermal comfort [45].

During hot summer months, these spaces provided shaded areas between units, which decreased direct solar exposure and heat accumulation. But at the same time, the semi-open arrangement allowed air to circulate between caravans, creating airflow that improved the ventilation naturally. At the same time, during cold and windy winters, these

same spaces worked as protective buffers, shielding openings and the external wall of the caravan against the strong winds and enabling households to maintain ventilation without increased heat loss. This passive environmental solution though not formally engineered shows how spatial adaptation served multiple purposes at once: social, cultural, and climatic.

This practice of compacted houses forms to respond to the environmental conditions is not unique to the refugee context but is deeply embedded in the architectural and urban traditions of the Middle East and North Africa (MENA) region [46]. Historically, vernacular settlements in arid and semi-arid climates have used compact urban layouts to increase shade, reduce heat gain, and avoid wind exposure [47]. Tight pathways, internal courtyards, and closely positioned structures provide passive environmental control, by enhancing thermal comfort and spatial efficiency. In this sense, the clustering observed in Zaatari Camp can be seen as an instinctual repetition of traditional regional knowledge, demonstrating how displaced populations continue to draw on genetic environmental strategies even when displaced.

Another commonly observed adaptation across Zaatari Camp to mitigate the effect of harsh environments is the households' effort to make green spaces within the boundaries of their shelters using their previous experience in Syria with self-sustenance through agriculture and planting. This increase of the use of vegetation, including small domestic gardens, potted plants (internal and external), and even makeshift water fountains. Many scholars and field reports have noted this occurring practice [48], which contributed to both environmental comfort and the well-being of refugees. Relying on knowledge from pre-displacement life, refugees with urban backgrounds used decorative plants and simple landscaping elements in shared spaces or in front of their shelters. Meanwhile, refugees from rural origins tried to use their agricultural knowledge to grow domestic plants such as herbs, tomatoes, or flowering bushes within the small courtyards and patios in their shelters[4].

This addition of vegetation provided multiple benefits. Plants helped cool the surrounding environment through evaporation, reduced dust, and provided shaded zones, especially in

[4] Based on field observations in the camp 2015-2018 & 2024.

areas with strong sun exposure Figure 3.13. In many cases, refugees installed basic water features, like basic hand-built fountains or recycled water containers, which increased the humidity and comfort during the hot summer months. Beyond the physical benefits, the act of growing plants also presented a symbolic restoration of normality and care, in a temporary and dry environment. These small-scale green interventions reflect an important dimension of vernacular adaptation, where refugees use the skills and knowledge from the time before the conflict and manage to utilize those when where in need.



Figure 3.13 Plants in the surrounding environment of the shelter.

In response to the extreme summer heat and the daily temperature fluxes, many residents in Zaatari Camp used insulation techniques to improve the thermal environment within their shelters. One of the most common solutions observed was the addition of multiple layers of insulation available materials, such as blankets, wood boards, plastic, or metal sheets on the inner or outer surfaces of the caravan walls and ceilings. Those layers provided as thermal buffer, reducing the heat transfer and creating better indoor environment, especially during peak summer temperatures.

A particularly remarkable and effective solution was the installation/construction of a secondary roof layer above the original caravan structure Figure 3.14. Refugees installed “canopies” or mounted corrugated metal sheets, wooden panels or sometimes solar panels- when possible- leaving an air gap between the two roof surfaces. This passive design solution usually seen in vernacular architecture across hot-climate regions allowed for convective airflow in the gap, stopping direct solar radiation from warming the main roof and minimizing heat gain inside their shelters. Although those interventions were informal and made with limited resources, they demonstrate a high awareness of environmental responsiveness and a systematic approach to shelter improvement.

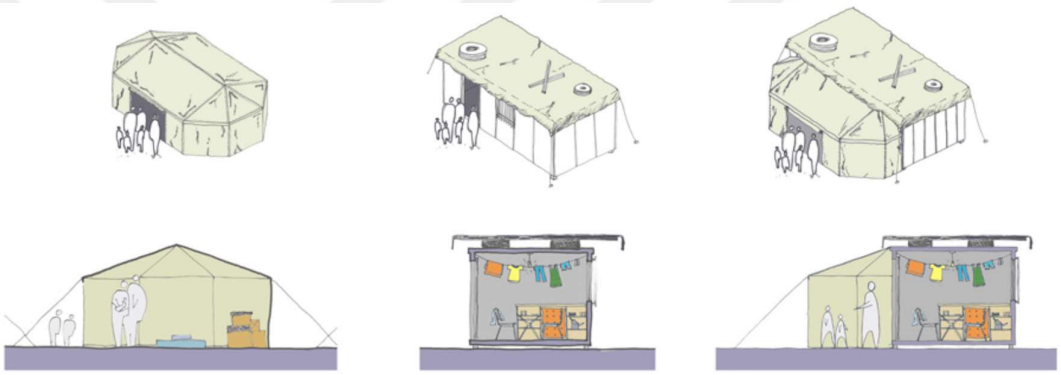


Figure 3.14 Shelter roof modification [49].

In many cases, environmental adaptation in Zaatari Camp went beyond simple insulation or roof layering and evolved into more complex spatial transformations. Building on the concept of creating an air gap between the caravan roof and an external sheet, some residents expanded this idea into fully functional covered spaces. For example, they have reused the materials from earlier emergency tents, such as thick plastic sheeting or tarpaulin, and stretched them above or around the caravans to shield them from direct sunlight and also to create semi outdoor areas. These spaces functioned as thermal buffers, reducing heat gain and allowed more comfortable use of the interior rooms. They also created shaded zones for domestic and social use, strengthening the layered spatial arrangement often seen in vernacular homes Figure 3.9.

Some residents -mostly those with construction skills, better economic situation or access to materials- moved beyond modifying their assigned caravans and instead built entirely new homes using the same sandwich panel material (which used to build the caravan). In

one such case (Observed in a video for one of the shelters shared by a reference [41]), a family constructed a full “home” composed of three rooms, a living room, kitchen, and toilet. Different from the linear layout of standard caravans, this constructed home reflected a more culturally familiar plan Figure 3.15. The living room was positioned away from external walls in the center of the plan and was only accessed (from outside) via a wide corridor, this corridor created an insulating buffer zone between indoor living spaces and the exterior environment. This has not only reduced heat transfer and dust penetration but also enhanced privacy and thermal adjustment.

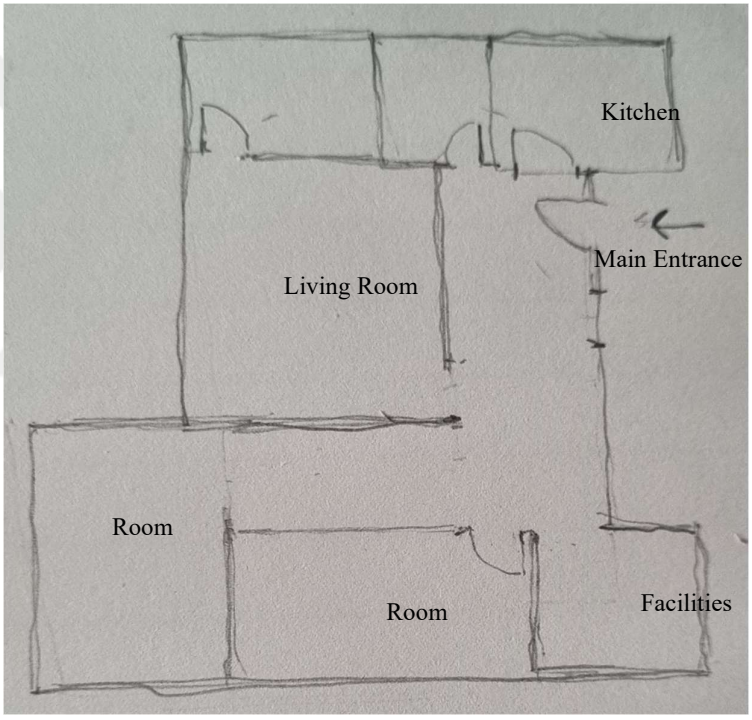


Figure 3.15 A sketch for plan of the house as seen from the video.

This approach of locating the core living spaces in the center and buffering them from external environmental exposure is deeply rooted in the traditional Syrian domestic architecture (as can be seen in Figure 3.9) and widely seen across the region. Historic homes in cities like Aleppo, Homs, and Damascus, as well as in rural areas, often featured central living spaces surrounded by thick walls or arranged around shaded courtyards. These spatial concepts were designed to reduce heat exposure, ensure proper ventilation, and maintain a stable indoor climate.

These examples highlight how some refugees employed advanced spatial solutions rooted in vernacular traditions to improve environmental comfort and social functionality. They also reflect a powerful shift from adaptation toward spatial redefinition, where the shelter is no longer just a modified unit, but a new home, firmly designed to meet the cultural, environmental, and emotional needs of the occupants.

3.5 Adaptation of Construction Techniques

As displacement prolonged over time, refugees in Zaatari Camp gained knowledge and skills on the materials provided by humanitarian organizations (tents, sandwich panels, and prefabricated caravans) converting them from strange elements to construction resources which they could employ with skill and accumulated knowledge. relying on both traditional building knowledge and experimentation, residents gradually learned how to cut, assemble, and repurpose those materials to meet their domestic needs. One of the interesting observations that was captured by multiple researchers was the wheels constructed to help moving the caravans around, to change the location or orientation of the unit[50]. Household construction/modifications are managed by the refugees themselves, with families' members being fully responsible for designing and assembling their shelters, shaping spaces incrementally as resources and needs grew (of course there was regular shelter maintenance provided by NGOs, but on ad-hock bases)[1]. As the camp estimated age extended by time, and the funding decreased, the camp management piloted a self-rehabilitation project for 50 families [51], which the camp management provided the resources needed for family members to implement the rehabilitation themselves which is considered a common socio-economic practice in Vernacular architecture. This also helped the shift of the shelter 'ownership' from the camp management level to household level.

One of the examples of this independence is the use of sandwich panels which originally planned as wall components for caravans, to construct entire new homes from scratch. In multiple cases observed, refugees assembled full layouts completely disconnected from the original caravan model. These self-built homes demonstrate not only technical adaptations, but also a growing spatial dialogue, where residents took control over their living environments, reimagining humanitarian shelter into something personal, functional, and culturally suitable.

3.6 Dynamic Shelter Adaptation

3.6.1 Caravan Reuse in Return Processes

In recent months, as the geopolitical situation of Syria have shifted [52], a small but increasing number of refugees have returned or begun to consider or pursue return from Jordan -from camps and off camps areas- to Syria [53]. Within this changing context, a new dialogue with space and shelter has started in Zaatari Camp: some residents have positively negotiated – illegally & informally - with the camp management authorities to dismantle their caravans and transport them back to Syria (as confirmed by two of the camp residents in Zaatari camp [41], [54])These undocumented, non-regulated negotiations represent an important turn in how refugees perceive and mobilize their shelter units. (Additional information about the returning process and shelter ownership change is listed in Appendix A).



Figure 3.16 Photo Shows the footprint of the empty family lot.

According to the same source previously mentioned [41], one extended family left Zaatari Camp in January 2025 and managed to dismantle and transport their caravans back to Syria. As shown in

Figure 3.16, the vacant footprint left behind clearly marks the location of their previous shelter within the camp. In discussing this specific case, the reference also shared a social media profile belonging to one of the family members [55], who began publicly advertising his skills in caravan construction and adaptation, Upon returning to his hometown, he employed the technical expertise he had developed while living in the camp to build new shelter units for other returnees. His public profile showcases multiple

videos documenting this effort, indicating a developing micro-economy around caravan-based construction in return areas.

Further investigation into the shared videos showed that the shelters featured on his profile were constructed using caravans transported from Idleb to Daraa and this was confirmed by the main reference [41], demonstrating a broader trend of caravan reuse beyond the boundaries of Zaatari itself. One important technical note raised by the reference was that not all caravan types are suitable for disassembly and transport. Quite a few models used in the camp are made from low-quality materials, making them inappropriate for the troubles of relocation and reconstruction. “In many cases, it is not the full caravan that refugees aim to reuse, but rather specific elements, primarily the corrugated metal sheets and structural steel tubes” [41], which preserve value as portable and reusable construction materials. These elements, even when removed from their original shelter form, become a form of mobile vernacular architecture, **connecting the space between displacement and return.**[5]

3.6.2 The full cycle of creation and adaption – Case Study from the camp

This case tells the story of a refugee family originally from a village in Daraa governorate, about 60 kilometers from Zaatari Camp. The main individual is one of the sons of the family, who arrived in the camp in 2014 at the age of 25. Before the conflict, the family lived in a one floor house in their village Figure 3.17.

The house had signs of a planned vertical expansion: reinforced concrete columns already been constructed for a second floor, a common image in the region where families slowly build additional floors as the financial resources and household size grow.

[5] Several trials were made to obtain a photograph of a reassembled caravan from Zaatari in Syria, but all sources rejected as it was considered illegal act.

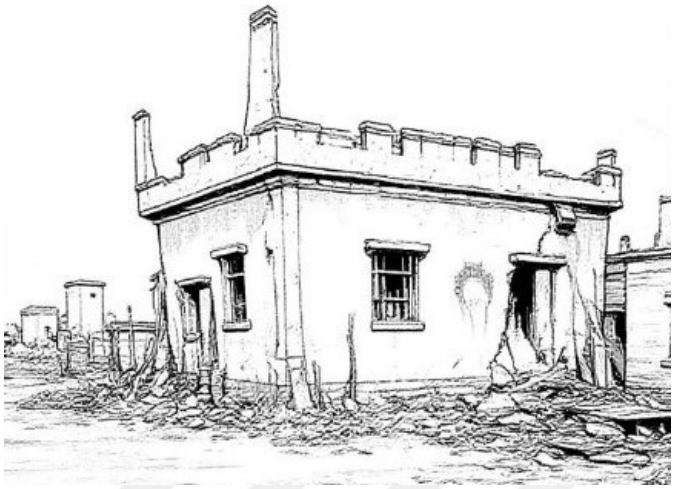


Figure 3.17 Generated sketch replicating the family house in Syria.[56]

When arrived in Zaatari, the family was first sheltered in a tent and later moved to a standard prefabricated caravan, like the thousands distributed in the camp. The resident, unmarried at that time, shared this shelter with his parents. In 2015, after getting married in the camp, he started the process of creating a separate household. He purchased his first caravan through personal financial resources, to create a home for his new family, and continuing the cultural habits, he installed his caravan next to his parent's shelter Figure 3.18. What started as a single caravan gradually developed into a more complex shelter. By time, the resident added a second caravan and constructed a shaded courtyard between the two caravans. The space between the caravans was roofed with corrugated metal sheets and functioned as a central living area for the household Figure 3.19. The two caravans were sleeping and indoor living rooms, especially during the winter months. Meanwhile, the kitchen and toilet were built from corrugated metal sheets. As the resident described, these materials were chosen purposely as they are more hygienic and easier to clean than the sandwich panels used in caravans, which erode when exposed to water.

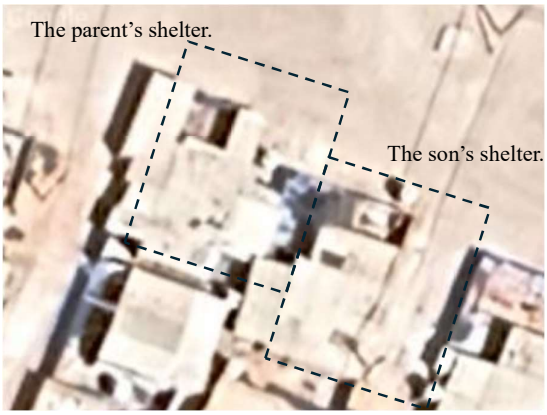


Figure 3.18 A photo taken from google maps to show the parent and the son shelters.

As the family grew, the shelter expanded. Through a gradual process, the resident transformed the two prefabricated units to a fully functional 'home'. With no formal training in construction, he developed the skills necessary to build, maintain, and adapt his shelter to suit his family's growing needs. Over the years, he became skilled in fixing structural elements, maintaining and proofing the shelter, knowledge gained through experience, which is aligning with Vernacular architecture definition.

By early 2024, the residents had reached a point of relative stability and began exploring outdoor upgrades. One of the improvements was a seating area fenced by corrugated metal sheet walls with a water feature. Most of the outdoor furniture was made from recycled materials, specifically, the wooden floor panels of older caravans.

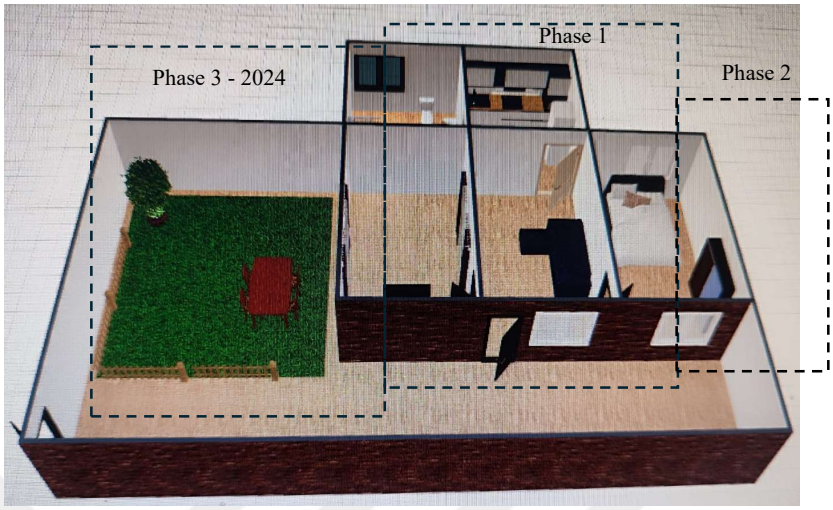


Figure 3.19 A 3d model created by the resident, showing the incremental growth of the shelter.[41]



Figure 3.20 Photo of the furniture constructed from the wood panels [41].

In 2025, during a conversation as part of this research, the resident spoke frankly about his thoughts on returning to Syria. His parents' home was damaged during the conflict. Additionally, the family's size had increased over the past decade, and the house would require rehabilitation and additional expansion to accommodate the bigger the family. Like many others, the family is uncertain about the returning decision: they lack shelter in their hometown, have doubts about the security situation, and do not have the financial resources to begin reconstruction. even though there were obstacles, the resident had considered returning home. He thought about dismantling the two caravans and transporting them back to his village, where they could serve as an initial form of shelter until rebuilding became feasible. He pointed out that the major barrier was the cost, as

transporting the caravans would require at least 450 Jordanian Dinars, an amount he does not have. No formal support was available from camp authorities or humanitarian organizations to assist refugees with caravan transport or housing reconstruction inside Syria at the time of writing.

Table 3.1 BOQ for the shelter items.

Item Description	Unit of Measurement	Quantity
Caravan 1: 5 M *3 M, 21 sandwich panels, with two windows and 1 door.	Lump Sum	1
Caravan 2: 6 M *3 M, 24 sandwich panels, with two windows and 1 door.	Lump Sum	1
Metal Corrugated sheets. 3 M length	Piece	30
Metal Tube, 4*4	Piece	40

However, he was confident in his ability to dismantle and re-construct the shelter independently. With years of experience, he developed all the technical knowledge needed to deconstruct the units and rebuild them in his hometown, requiring only one additional person to assist. In this situation the caravans were not temporary shelter, but rather a long-term asset, transportable, functional, and an important need tied to his family's future stability.

The dismantling of a caravan and reusing it in Syria is not just a logistical need; it is a deep strategic and symbolic adaptation. In a situation where return destinations are destroyed with damaged homes, bringing the caravan home becomes a form of architectural continuity, to ensure that displacement does not result being without shelter. The prefabricated shelter, originally formed as a short-term emergency unit, is repurposed as a core building material for restarting life after returning.

The shelter practices seen in Zaatari Camp shows how displaced population in the camp have engaged in continuous, creative, and culturally connected adaptations of their shelter environments. From incremental extensions and climate-responsive modifications to the reuse of recycled materials and the construction of personalized courtyards, these

modifications reflect central principles of vernacular architecture, i.e., adaptability, resource efficiency, cultural continuity, and user-driven construction tools and techniques. Even with the limitations of materials availability and regulations, residents have drawn on construction knowledge, invention, and social norms to shape their surroundings in ways that reflect both functionality and identity. Even the growing trend of dismantling and reusing caravans for return shows a mobile and transitional vernacular mindset that bridges displacement and homecoming. These practices confirm that even within humanitarian displacement context, which is designed for standardization, vernacular architecture exists in the daily lives of refugees themselves. This chapter affirms that Zaatari is not only a site of displacement but also a living example of vernacular adaptation.

CAPTER 4

COMPARATIVE CASE STUDY

The theory of temporary camps, and temporary shelters is reformed when camps became more than just a temporary option. As can be seen in many prolonged refugees' camps im the Middle East, camps grow, reshape and evolve way beyond their initial purpose of emergency settlement. Compared to the same national and humanitarian context, Zaatari camp was not the only which hosted tens of thousands of refugees for long time.

In order to select the comparable camp, the below set of criteria were designed to select a case study that aligned with Zaatari refugee camp in terms of displacement context, camp structure, and cultural relevance.

The following criteria guided the selection process for the camp for the comparative analysis:

1. Shared Displacement Context. The selected camp must originate from the same conflict (the Syrian conflict) to ensure that the refugee populations share similar cultural backgrounds. This would enable coherent analysis of shelter adaptations.
2. Refugee Camp. Only formal camps outside the Syrian borders were selected. The reason of excluding the internally displaced persons (IDPs) camps, as both populations and camps, operate under different frameworks which might influence their shelter practices and adaptations.
3. Large-Scale populations. The selected camp should host a large number of households. Large enough to have collective shelter practices, and diverse the individual level practices.
4. Formally Managed Camps. The selected case should be officially managed by either national governments, UN agencies or any humanitarian organizations. The presence of formal management introduces coordinated shelter policies and guidelines. Which plays a critical role in shaping the shelter outcomes and autonomy.
5. Regional and Cultural Proximity. The selected case must be located in one of the neighboring countries of Syria. This limitation will support the analysis by ensuring similarity of the cultural environmental conditions and avoiding including large

number of locations where the legal, climatic conditions are different from Zaatari. (such as Europe).

4.1 Selection of Comparative Camp

After the application of the selection criteria, a list of formal Syria refugee camps in neighboring countries was created (Appendix B). the search considered Jordan, Türkiye, Iraq, Lebanon and Egypt. The list was filtered based on displacement origine, formal status of the camps, population size, presence of a management entity and regional proximity. While many camps fulfilled some of the criteria, Azraq Refugee Camp in Jordan was the only case that met all the conditions listed above. It is a formal camp, established outside Syria, have large population of Syrian refugees, and managed by UNHCR and Jordanian authorities, and is in a neighboring country with similar environmental and cultural conditions. Therefore, Azraq Camp was selected as the comparative case for this study to provide a meaningful and contextually relevant analysis of shelter adaptation in prolonged displacement settings.

4.2 Shelter Adaptations in Azraq Camps



Figure 4.1 Shelters in Azraq Camp[57]

Established in April 2014 to avoid overcrowding Zaatari camp [58], It is a purpose-built camp, which has taken account of lessons learnt from the Zaa'tari camp[59]. It had been

planned, designed, and under construction since 2013, during which time refugees were still fleeing Syria in constant waves [60]. The camp is structured in a grid system, with villages and blocks layout [59]. The well-designed camp of Azraq have decreased the scope of appropriations in exchange for a spatial arrangement fostering increased control [61], refugees have less control over their shelters, when refugees arrived at the camp, all shelters were already built [62]. In Azraq, residents were assigned to pre-installed caravans that had been securely fixed to concrete foundations, rendering them immobile and effectively eliminating any potential for spatial expansion[60].

The rigidity of the camp layout, and on the 'management' style of the camp, limited the adaptive capacity of the camp, as can be seen satellite imagery in (Figure 4.2) although it's been more than 10 years since the establishment of the camp, you can see clearly that shelters are still in strict layout.



Figure 4.2 Satellite Image of Azraq Camp [63].

In addition to reviewing public resources and academic literature, this research also furthered benefited from direct feedback shared by a former colleague, a skilled welder who previously lived in Zaatari Camp and currently living in Village 5 of Azraq Camp since 2019[64]. We had the chance to have a series of online conversations, he generously answered all the questions, provided detailed commentary and shared several

photographs of his personal shelter[6], showing the adaptations, he has implemented over time on his own shelter.

According to this reference, while residents of Azraq Camp face high limitations concerning structural changes to their own shelters, some degree of flexibility exists when it comes to modifying the surrounding outdoor space. He clarified that he was able to install additional two rooms to his T-Shelter, approximately 4 square meters each, creating an additional space that is connected to the original shelter structure. This modification was done using corrugated metal sheets and structured by metal frames. Additionally, the space around the shelter was fenced with the metal sheets to form a private outdoor yard, increasing the sense of ownership and privacy for his family. Within this area, the family installed a "desert air conditioner" (commonly known as sahrawi AC), a cost-effective evaporative cooling system often used in arid environments, to improv the indoor comfort during summer worm months.

The images he shared also show interior adaptations purposed to increase thermal insulation. The family had installed layers of cloth and other insulating materials (sheets) were covering the interior walls and roof of the T-shelter unit, to increase the protection of the exposed surfaces during the hot climate known in the Jordanian desert. While these adaptations considered relatively modest compared to the more complicated modifications seen in Zaatari Camp, they highlight the resilience and creativity of residents within the high regulations of a tightly managed camp setting. These solutions, which are considered informal and individually initiated, reflect a wider trend of personalization and adaptation in response to the limitations of standardized humanitarian shelter design/model.

4.3 Shelter Policy and Regulations in Azraq Camp

One of the most distinguishing differences between Azraq and Zaatari Camps is the institutional governance of shelter and its usage. An important point derived from personal communication with a resident in Village 5 of Azraq Camp shows that residents are required to sign a form when receiving the shelter unit or an additional shelter unit. This formal procedure stands in contrast to Zaatari Camp, where such agreements do not

[6] Those photographs were not included in this research to maintain the resident privacy.

exist; beneficiaries in Zaatari receive shelter units without formal ownership or responsibility documented in writing.

Two references provided copies of those signed forms, one was issued in 2015, and the second one was issued in 2019. which shows that these protocols have been in place for nearly a decade. Those documents represent formal agreement between the refugee (beneficiary) and the camp's managing authorities. The form mentions the serial number of the assigned shelter unit and lists a series of conditions that clarify the use and responsibility.

Some of those conditions that are relevant to this research:

- The beneficiary has the full responsibility for maintaining and cleaning their shelter.
- Following the receipt of the shelter unit, the beneficiary has 3 days to submit complaints or requests for maintenance.
- If the beneficiary plans to leave the camp temporarily or permanently, they are requested to return the shelter keys to UNHCR, if not done this may result in rejecting the exit process.
- If the shelter is found to be vacant for over one month, the camp authorities have the right to reclaim and reassign the unit to another household in need.
- Beneficiaries are prohibited from renting out or transferring the shelter ownership to others, in part of it or the whole unit.

These reflect a broader policy that would reinforce a non-permanent, controlled form of shelter management. In contrast to Zaatari, where personalization and modifications of shelter structures happen informally and often flourish, Azraq's contractual arrangements limit such spatial autonomy. The presence of formal documents signals an attempt by camp authorities to prevent informal shelter transactions, and preserve a uniform, centralized control over camp shelters.

Moreover, these measures reflect a broader humanitarian governance logic, the one in Azraq Camp treats shelter as a managed asset and not as an element of livelihood. When considered alongside the flexible modifications seen in Village 5 -as discussed in Section 4.3- it becomes evident that shelter governance in Azraq has gradually shifted toward a hybrid model: formally regulated but increasingly open to negotiated adaptation in some

zones. This dialogue between institutional control and adaptation highlights the complexity of shelter politics in long-term displacement settings.

4.4 Shelter, Permanence, and Return Dynamics in Azraq Camp

As of March 2025, a total of 43,704 Syrian refugees voluntarily returned home from Jordan between December 8, 2024, and February 22, 2025. Which includes 2,393 Syrian refugees left Azraq Camp to return to Syria[65]. The research emphasized a different procedural element between Azraq and Zaatari Camps when the dynamics of this return process was explored. Zaatari Camp authority allows an organized procedures where refugees can load their personal belongings to trucks from within the camp, a more restricted policy is enforced in Azraq Camp where transport trucks are not allowed to enter the camp shelters area. Accordingly, returning families must carry their belongings to the administrative gate, for transportation arrangements. This practice is further validated by social media videos showing large volumes of personal items gathered at the main gate awaiting shipment. This logistical setup indicates a deeper institutional framing of Azraq Camp as a strictly managed transitory space.

Since residents are not allowed to ship their belongings directly from their shelters and should instead go through controlled areas then the shelter unit itself is implicitly considered as non-transferable and impersonal. The field reference from Azraq Camp [64]confirmed that dismantling the shelter units to take it upon return is formally not allowed, unlike in Zaatari Camp, where such practices are allowed in some cases. In Azraq Camp, even the removal of individual components of the shelter such as metal sheets, pipes, or construction materials is prohibited, which affirms the controlled and standardized nature of the shelter infrastructure.

These conditions re-emphasize the conception of Azraq Camp as a dormitory-like or transit facility, instead of a space intended for long-term stay. Refugees are neither encouraged nor permitted to significantly modify, adapt, or claim ownership over their own shelter units. This stands in complete contrast to Zaatari Camp, where shelter adaptation stated as a feature of everyday life, and where personalization plays a central role in how survival, identity, and eventual return are conceived by residents.

4.5 Cross-Case Analysis and Lessons Learned

This comparison shows how differing institutional policies either enable or restrict the development of vernacular architectural practices in refugee camps. In Zaatari, a relatively flexible governance model had allowed the residents to gradually shape their shelters in ways that reflected familiar spatial forms and practices. In contrast, Azraq's formalized, rigid layout and contractual control over shelter use had limited such expressions of vernacularity .

Table 4.1 Analysis between the two camps.

Aspect	***Zaatari Camp***	***Azraq Camp***
Urban Layout.	Preplanning the main structure of the camps.	Pre-planned
Early Shelter Approach	Tents, then caravans.	Standardized T-Shelters.
Allowance of integration of other construction materials (permanent structures; concrete, blocks etc.)	Not allowed	Not allowed
Allowance of integration of other construction materials (temporary metal sheets, wooden panel etc.)	High	Low
Resident Autonomy	High.	Low.
Cultural Adaptations.	Strong	Weak
Environmental Responsiveness	Strongly Observed	Weakly observed.

The comparison of Zaatari and Azraq Camps (Table 4.1) highlights the important role of resident agency, institutional frames, and planning philosophy in shaping shelter results within refugee camps. These factors determine who makes decisions about space, how flexible the shelter policies are, and what degree of self-modification is permitted, all of which directly influence the evolution of the built environment. Zaatari Camp demonstrates how a non-restrictive environment where residents are allowed to adapt, personalize, and even relocate their shelters can stimulate a strong sense of ownership, environmental responsiveness, and cultural continuity. On the other hand, Azraq's rigid design, formal shelter agreements, and restrictions on shelter return have presented shelters as depersonalized and non-transferable assets, decreasing residents' incentive or ability to adapt. While Azraq Camp residents have managed some creative outdoor and interior adjustments, these have largely taken place despite institutional limitations rather

than through supportive policy. Importantly, cultural practices such as clan-based clustering and communal gathering were established in Zaatari Camp through bottom-up processes that were suppressed in Azraq Camp by design. These findings highlight the limitations of standardized, top-down shelter planning and confirm the need for flexible or collaborative participatory approaches. Humanitarian shelter strategies must shift from short-term response design toward long-term adaptability and recognizing refugees not just as beneficiaries of aid but recognized as active stakeholders in the shaping of their built environments.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

This study was set out to navigate how displaced populations engage in shelter adaptation dialogues within the humanitarian constraints, by using the case of Zaatari Refugees' Camp as the main example of analysis. The research followed the evolution of shelter practices within the camp, assessing how the imposed, standardized shelter solutions were gradually transformed and changed through resident agency, cultural practices, and environmental adaptation. By comparing Zaatari camp with Azraq Camp which was chosen for its structural, geographic, and institutional similarities, this thesis highlighted the various degrees of flexibility allowed to residents and their long-term impact on shelter outcomes.

In Zaatari Camp, shelter solutions which began as a temporary humanitarian intervention devolved into a complex advanced vernacular settlement. Refugees implemented incremental modifications using the available materials (tents, sandwich panels, metal and wooden sheets, prefabricated caravans), repurposing them to construct more suitable, familiar to their culture, and climate-responsive shelters. These adaptations reflected both the inherited building skills and the new techniques developed in the camp. By time, a strong sense of ownership occurred, as families started to reshape and expand their homes, constructing entirely new layouts that aligned with traditional Syrian spatial layout.

On the other hand, Azraq Camp was seen as a highly controlled, pre-planned environment. Caravans were fixed into concrete slabs, the space between units was wide to restrain clustering, and restrictions on materials remained in place for many years. As a result, adaptation was delayed and limited. The rigid shelter design prevented community expression and limited the capacity of residents to shape their own environment according to cultural, social, or environmental needs.

The comparison between those two cases demonstrated that shelter is not a neutral or merely technical intervention, it is a socio-spatial process deeply embedded in questions

of identity, dignity, and autonomy. When flexibility is allowed, and when institutional structures allow for adaptation, displaced populations actively recreate a sense of home. In contrast, where rigid planning controls, adaptation is suppressed, and shelters remain unknown and unwelcoming.

5.2 Key Insights

Several themes developed from the analysis:

- Resident agency is very central to the development of shelter spaces. In Zaatari, the ability of residents to manage, modify, and even reconstruct their shelters led to improved livability, cultural coherence, independency and psychological comfort.
- Material flexibility is very important. The use of modular or modifiable materials (such as sandwich panels) allowed for greater experimentation and adaptation in Zaatari, whereas fixed shelters in Azraq restricted change.
- Standardization could be counterproductive. While Azraq's layout ensured order and high level of management, it did so at the expense of community cohesion and long-term resilience.
- Shelter self-adaptation is not a sign of failure; it is a sign of success. Informal modifications should not be seen as breaches but should be seen as expressions of need, creativity, and the agency that humanitarian actors can and should learn from, and even build on.

5.3 Practical Recommendations

Based on the findings from the comparison between both camps, the following recommendations are proposed for the humanitarian shelter practitioners, planners, and policymakers:

1. Design with Adaptability in Mind

Longer term shelter solutions should be designed with modularity and flexibility already in mind, to allow families to extend, reconfigure, and improve their shelters as their needs

evolve. Prefabricated shelters or any shelter solution should not be expected to be a static solution.

2. Allow and Support Resident Modifications

When safe and appropriate, humanitarian agencies should allow and even support resident-driven shelter adaptations. This would include providing access to tools, technical guidance, and safe materials for construction and improvement works.

3. Reconsiderations of Site Planning Principles

When designing camps layouts, manageability and cultural spatial needs should be balanced. Allowing (when applicable) clustering, shared spaces, and traditional family closeness. Which can improve social cohesion and daily comfort of the impacted populations.

4. Emphasize and Integrate the Local Knowledge

Refugees possess construction skills and clear cultural knowledge which they are familiar with. Humanitarian shelter strategies should focus on pursuing the integration of these capacities into the design and governance of shelter programs and solutions. Which would help build the humans who've been exposed to disasters or conflicts.

5. Shifting the Institutional Mindsets

After a specific time threshold, humanitarian shelter strategies must move beyond the logic of short-term emergency solutions. Regulations that restrict improvement or forbid permanence, usually justified by political sensitivities around return, could damage the well-being of displaced populations over time.

6. Facilitate Reuse of Shelter Units in the Context of Return

As seen from this research, refugees -when possible- dismantled their shelters and taken them back to their hometowns. Camp authorities should formally allow this practice as a practical form of shelter assistance during the return process. Especially that residents in the camp had invested from their own money to improve their shelters.

5.4 Future Research Directions

This research had focused on two refugee camps in Jordan that shared same national and cultural context. Future work could explore similar comparative analysis in other host countries, or other contexts to examine how different control structures and humanitarian policies influence the shelter adaptations differently.

More investigations are also needed into the long-term environmental and thermal performance of self-modified shelters, especially as climate adaptation becomes an increased concern globally. Assessing the sustainability, energy use, and heat mitigation approaches rooted in resident-led shelter solutions can inform more environmentally shelter programs.

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Appendix A – Returning Process

As shared by Reference 2 [54], when a refugee decides to return to Syria, there is a formal procedure that needs to be followed. The process requires obtaining two forms. First, the refugee needs to register with UNHCR (Camp management agency) to obtain the official Return Registration document. After this, they can request a Clearance Form, which can be issued after a UNHCR staff member visits their caravan. During this visit, UNHCR reclaims the caravan, shifting the ownership from the refugees to the organizations. The staff member examines the condition and quantity of the caravan(s) but they dont assess or demand the return of any additional structural elements such as corrugated metal sheets or other metal beams

According to Reference 2, UNHCR and camp agencies performed a comprehensive assessment and generated a database in the previous year (2024) to record the number of caravans each household has. When performing the clearance visit, UNHCR staff members compare the number of caravans documented in the database with the actual number on site. However, Reference 2 confirmed that this process is not accurately implemented, and some discrepancies are generally tolerated.

Reference 3 [66], a senior staff member in one of INGO in Zaatari Camp, had explained that the camp management agency assesses the condition of the caravan or sandwich panels during the spot checks. If considered proper, another agency responsible for shelter management collects and stores the dismantled units in their warehouse. These materials are stored to be used for maintenance and repair of other shelters in the camp in future.[7]

Additionally, Reference 2[54] mentioned that some refugees manage to sell one or more of their caravans before the spot check, using the money gained to support their returning process and restart their lives back at home. Some also succeeded in transporting disassembled caravan parts out of the camp unnoticed by camp management, this was confirmed by Reference 3 [66] as well.

[7] At the time of writing this research, formal communication was shared with both UNHCR and the shelter agency to confirm the process. and no feedback was received yet.

As confirmed by Reference 1, UNHCR covers the cost of a shared transportation for returning refugees, including up to 50 kilograms of personal belongings per individual. However, if refugees wish to ship additional furniture or belongings beyond this, they need to finance it themselves.

Appendix B – List of Formal Syrian Refugee Camps in the Neighboring Countries

Table B.1 List of formal Syria refugee camps in the neighboring countries.

Country	Camp Name	# of population (individuals)	Date of population	Reference
Jordan	Zaatari	69212	30-Apr-25	[67]
Jordan	Mrajeeb Al-Fhood (Emirates Jordanian Camp)	6593	30-Apr-25	[68]
Jordan	Azraq	40159	30-Apr-25	[69]
Jordan	Garden Camp	167	30-Apr-25	[70]
Türkiye	7 different camps	62000	17-Jan-24	[71], [72]
Iraq	Darashakran Camp	11824	01-Nov-24	[73]
Iraq	Qushtapa Camp	8580	01-Nov-24	[73]
Iraq	Kawergosk Camp	8142	01-Nov-24	[73]
Iraq	Basirma Camp	1834	01-Nov-24	[73]
Iraq	Domiz Camp	28467	01-Nov-24	[73]
Iraq	Gawilan Camp	11526	01-Nov-24	[73]
Iraq	Domiz Camp 2	10086	01-Nov-24	[73]
Iraq	Bardarash Camp	2	01-Nov-24	[73]
Iraq	Arbat Camp	9557	01-Nov-24	[73]
Lebanon	NA	NA	NA	[74]
Egypt	NA	NA	NA	[75]

Notes:

1. Camps in Jordan and their related figures, are taken from UNHCR Operational Data Portal, which is a dynamic reporting platform. Figures were taken at time of research.
2. No formal camps were established in Lebanon and Egypt.
3. Although exists in UNHCR Operational Data Portal, Cyber City camp in Jordan is closed. [76]
4. Some of camps in Iraq have other nationalities as well.