Self-reliant in a resilient space: Bedouin architecture in extreme conditions

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Abstract

In the midst of economic turmoil and environmental adversity, Bedouin communities in the Levant demonstrate remarkable resilience through their architectural practices and communal ethos. This study examines the spatial dynamics of Bedouin settlements, exploring their adaptation strategies during the economic crisis of 2023 in Lebanon, and drawing insights from Bedouins in Palestine, Jordan and Egypt from the early Islamic period (600 AD) to the present-day. The essence of Bedouin identity, embodied in the term 'badou', reflects a resilient lifestyle rooted in mobility, adaptability and mutual dependency. An analysis of architectural typologies - caves, tents and caravanserais - reveals spatial strategies that promote economic autonomy and communal bonds. The resonance of Bedouin architecture with contemporary discourses on self-reliance, community and resilience is evident. Using local materials, traditional craftsmanship, and collective ownership, Bedouin communities exemplify holistic resilience that integrates social, economic, and environmental dimensions.

In conclusion, Bedouin architecture offers timeless lessons for contemporary practice and urban planning. Its ethos of self-reliance and communal solidarity serves as a beacon for navigating the complexities of an interconnected world and building a more resilient future.

Keywords

Bedouin architecture – Resilience - Self-reliance - Adaptation strategies - Economic crisis - Community cohesion - Spatial dynamics - Cultural resilience – Commoning - Environmental sustainability – Middle East – Levant Region – Arabian Peninsula

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It's hard to imagine a life without a garden or balcony, whether I'm in the Netherlands or Lebanon. It's like having a house without a living room or kitchen. I can't imagine myself living in Lebanon without an outside extension of my dwelling. I've lived in a small village in the northern mountains of Lebanon, and part of my family still lives there. The garden has always been part of our daily life. It's important to have a space in front of the house. The garden consists of various herbs, fruits, and vegetables, and there's even space for chickens, goats, and rabbits. It's more than just a garden; it's a place where the family gathers and comes together with the rest of the neighbourhood. It's like an extension of the living room in the house. Each house in the village has a small garden, which they've adapted to suit their way of living. Living in the village means I don't need to go to the city, as everything you need is already there. Everything is readily available. However, if something is needed that is not available locally, there is always my neighbour or someone in the neighbourhood who is going to the city Tripoli in northern Lebanon. Moving to Europe and living in the suburbs of a city has changed my daily life quite a bit. The house has a small garden in the front and a closed backyard that is separated from the neighbourhood. There's no space in the backyard for planting herbs, fruit or vegetables. It’s hard to connect to the neighbours and have a conversation. I've always felt uneasy about living in the Netherlands because it's difficult to adapt my house to my way of living and use my backyard like I’m used to. I feel vulnerable and my family and I are dependent on our own and we’re disconnected from the community. I doubt if there is a community in my neighbourhood. There is the need to go to the supermarket every day, even for the smallest things. This raises the question of whether living in a small village in Lebanon, making your food, and having your community around you, makes you more resilient and self-sufficient as a community, family and as a person, instead of being an individual living in the suburbs in Europe. Furthermore, how can architecture and dwelling provide self-sufficiency and resiliency for an individual and the community?

In February 2023, the Lebanese pound lost almost 90 percent of its value according to the World Bank (Al-Saeed & el Khalil, 2023). Furthermore, the poverty rate in Lebanon has reached 50 percent, with half of the population living below the poverty line (Al Helou, 2023). Following a series of events, including the global pandemic and the explosion of the port in Beirut, which exacerbated an already challenging economic situation in Lebanon and triggered a liquidity crisis in February 2023, depositors were unable to access their funds in banks due to the latter's decision to block almost all savings accounts in the country. The poor liquidity management of the banks in Lebanon, the low value of the pound, and the high prices for medicines and food have placed many people in a desperate situation, forcing them to find alternative means of survival. This has led to a significant increase in the number of people engaged in farming and agriculture, with many turning to their gardens to grow their own food instead of relying on supermarket purchases.

"Self-sufficiency starts at home. I used to buy everything from the shops. Today, all the vegetables I need are available here," stated Shreim (Taher & Gebeily, 2022). A 42 old construction worker turned into a farmer, due to the economic meltdown, in the village of Houla in southern Lebanon (Taher & Gebeily, 2022). He feels shielded by his self-sufficiency. This observation has led me to reflect on the self-sufficient lifestyles of rural communities and the Bedouins who reside in Lebanon. In order to cultivate and grow food independently, one must possess the requisite space. This concept extends to the livestock as well. I have consistently been impressed by the resilience and independence of the Bedouins. It appears that they live in isolation from the prevailing social and economic systems of the wider population. Their lifestyle enables them to be self-sufficient and resilient to economic and political upheaval.

This paper will investigate the spatial practices of the Bedouin in relation to the economic crisis that Lebanon endured in 2023. The research will examine case studies of Bedouins in the Levant region, in Lebanon, Palestine, Jordan and Egypt. The Bedouins are nomadic Arabs living in the Arabian Peninsula, the Levant region and North Africa. The crisis forced people to create their own economy because the existing economy did not provide for them. Similarly, the Bedouins have their own economy and community. They are self-sufficient and survive without being dependent on the existing capitalistic, social and political systems. The Levant region, where the Bedouins live and are culturally similar to the Lebanese, will be the focus of this study. The study will examine case studies in Petra in Jordan, Galilee in Palestine, and Siwa in Egypt. The study will investigate Bedouins who are fully nomadic, semi-nomadic, and less nomadic, but who maintain a nomadic lifestyle. This is to relate the nomadic lifestyle to our present-day way of life. The case studies will assist in establishing an understanding of the development of how they live and occupy space over time, from the early Islamic period to the present day. This will be achieved by first defining the term "Bedouins" and the concepts of self-reliance and resilience in architecture. Additionally, the study will examine how they occupy spaces, starting with the private spaces within the dwelling and progressing to the more public spaces of the dwelling, before moving to a wider scope within the region and discussing the architectural stations that operate as a connection between the Bedouins and the broader political and economic system.

Badou

The term "Bedouin" is derived from the Arabic word "badou," which is connected to the word "badia," meaning "the beginning." That’s why Bedouins see themselves as the original inhabitants of the region, the natives. They have historically endured harsh conditions in the desert, and their nomadic lifestyle has been shaped by the need to move with their communities, food, and herds in response to the demands of their herds and flocks (Salzman, 1967). Their flexible way of life has enabled them to adapt to changing circumstances. The Bedouins have developed a way of life that has enabled them to survive in the desert and have maintained a strong community structure. They are the nomads of the desert. They move throughout the desert and are the dwellers of the desert. The Bedouins are Arabic-speaking nomadic people in the Arab Peninsula, Egypt, Palestine, Iraq, Syria, Jordan, and North Africa. Bedouins are nomadic people who are constantly in movement in search of pasture for animals (Fisher, 1961). Similarly, Patai states that nomadic people are those who derive their livelihood from tending herds. Bedouins have mainly horses and camels as their main animals. The nomads are people who dwell year-

round in portable dwellings (Patai, 1951). The primary motivation for this movement is not solely driven by the need for pasture and food for their herds, but also by the challenging climatic conditions prevalent in the Arabian Peninsula and the Sahara in North Africa. As a result, the Bedouins relocate with their herds, seeking to avoid the arid regions and the scarcity of pasture and water (Stenning, 1960).

Self-reliance in architecture

Self-reliance in architecture has more to do with the inhabitants of the dwelling and their collective knowledge. A survey conducted by Smits indicates that individuals who have constructed their own homes and possess the necessary knowledge and resources are more self-reliant than others. They can build and repair their houses, demonstrating a high level of self-sufficiency (Smits, 2019). Those who do not build their own houses lack the knowledge required to do so and are therefore more dependent on others in their community. As a community, they are more self-reliant when they share the knowledge of building a house. Self-reliance in architecture is the willingness to learn and build one's own housing and apply the historically practised methods to build buildings in these communities, as demonstrated by the Bedouins. Self-reliance is defined as the capacity to independently provide a qualitative built environment through the application of one's powers, knowledge, materials, and construction methodologies (UNHCR, 2005). Despite the financial constraints, communities in Kenya have demonstrated the ability to build their own houses by collecting natural materials and maintaining and extending their house solutions through self-reliance (Smits, 2019). Nevertheless, external support is required to bridge the gap between the current and the desired capacity, to sustain their self-reliance.

Commoning in architecture

The community has more control over architecture than the architecture itself has over the community. This phenomenon is not limited to the Bedouin community but can also be observed in contemporary examples of commoning in architecture. In post-crisis situations, when the community assumes control, such instances of commoning become particularly evident. These communities or groups are empowered by a variety of activities, including self-learning, teaching, acting, research, and reclaiming alternative spaces, urban farming, and city centres that are threatened by external development (Tan, 2015). Additionally, they undertake daily activities and collaborate. Rather than focusing on the common property that is shared, owned, and produced, the emphasis is on the social relations that are closely connected (Harvey, 2013).

Resiliency in architecture

Resiliency in architecture can be defined as the ability of housing or public buildings, for instance, to adapt to the changing needs of the user. Resiliency in housing can be understood as a means of protecting against social and environmental changes and disasters, as well as an inclusive approach towards the community. This can be achieved through participatory and collective planning, which is essential for the sustainability of social networks, local businesses, and neighbourhood economies. These factors are crucial for maintaining the integrity of communities (Barton, Gans, & Palmer, 2018). A holistic approach to building a resilient community must address historical social inequities, adopt inclusive planning, and integrate durable, adaptable, and community-focused housing solutions to ensure the long-term well-being and resilience of the community. Architecture

for resilient communities should include anticipation, adaptation, and recovery from adversity. Communities that are responsible for land use, have affordable housing, and inclusive public spaces are more resilient. The global pandemic and political upheaval have revealed social, economic, and environmental inequalities that threaten communities worldwide (Rubbo, Du, Thomsen, & Tamke, 2023). Resiliency is not only applicable socially but also environmentally. Architecture should adapt to environmental changes through the application of knowledge and the implementation of solutions that result in buildings, neighbourhoods, landscapes, cities, and regions that are regenerative, resilient, and capable of adapting to climate change (Rubbo, Du, Thomsen, & Tamke, 2023).

Bedouin architecture

The Bedouins are nomadic people who move across the Sahara in North Africa and the Middle East. Despite being called Bedouins; they have different cultures and ways of life depending on the region they are staying in. The Levant region, currently Jordan, Palestine, Syria, and Lebanon, is a region that consists of desert and non-desert environments. Nomadism is generally favoured by political and economic unstable conditions (Falah, 1990). A review of the region during the early Islamic period around 600 AD reveals that the nomadic population was unable to be controlled by a single state and kept within state borders (Helms, 1990). They lacked a central government. It would be useless to control them within the borders of a single state, given their constant movement as illustrated in the map below, which shows their movements across almost the entire region (Figure 1).

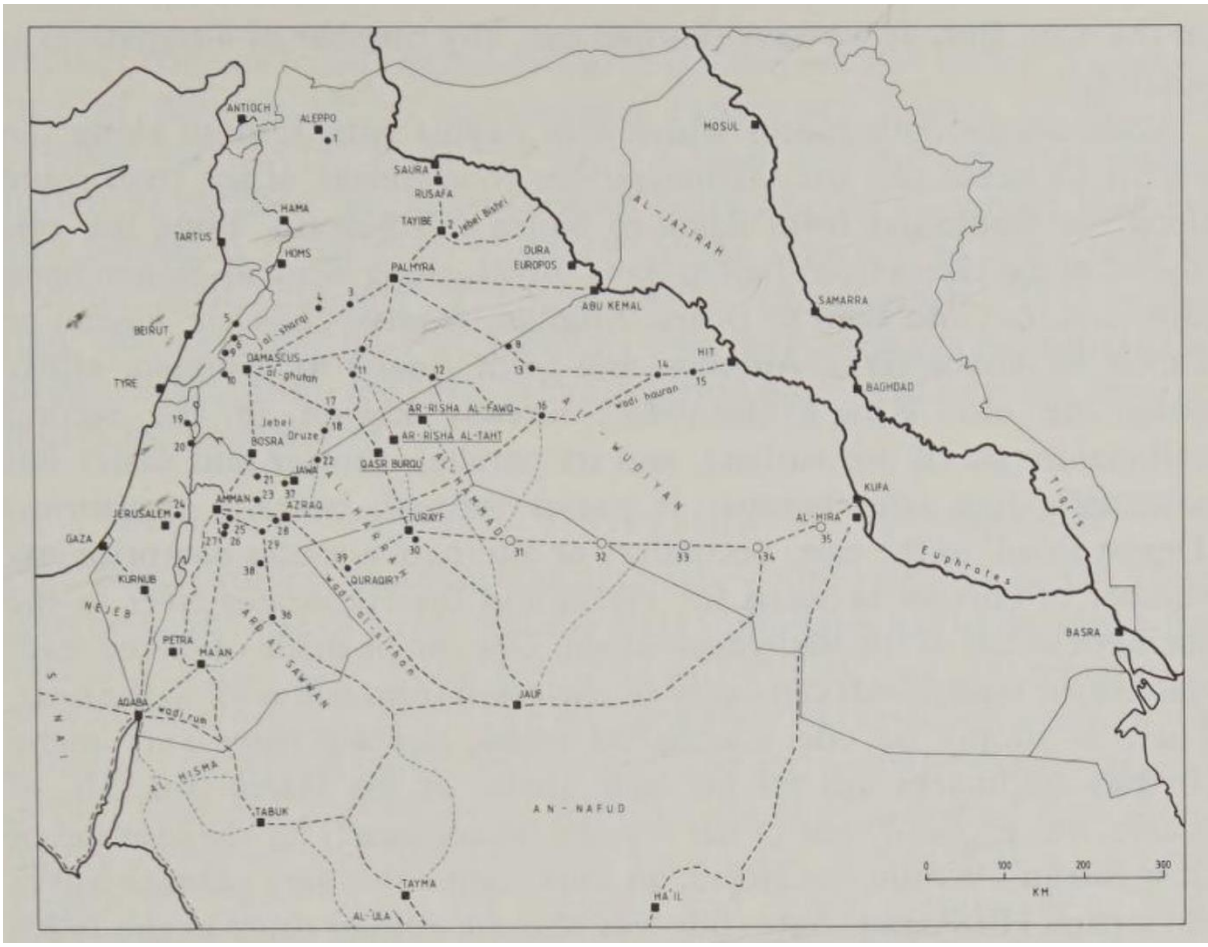

Figure 1 Established routes by the Bedouin in the Levant region across state borders (Helms, 1990).

Bedouin camp

The majority of Bedouins derive their livelihood from the products of their agricultural and pastoral activities. Bedouins in Petra produce food from local areas and small gardens around their camp. They obtain limited food from the wider economy (Simms, 1988). Therefore, they require more space for their food and separate spaces with a specific spatial design for their community. Given that they live in small communities across the desert of Jordan, Bedouins in Petra have a specific spatial design for their camps. According to archaeological research conducted by Simms in 1988, zones for living, livestock pens, and communal areas are specified (Figure 2). Additionally, storage spaces are prevalent in Bedouin camps. These spaces are beneficial in instances of reduced rainfall, resulting in poor harvests. Similarly, in times of economic hardship, storage areas can be utilized to preserve food. These spaces are used for temporary storage until the food can be used or taken along with them when they move again. The storage spaces are also used for organising their farming tools. Bedouins in Petra utilise natural materials and adapt to the environment. The camp is designed based on cultural preferences, social interactions, community cohesion, and cultural identity. In Zone 1, the daily activities include cooking, laundry, daytime meals, conversations and women's night-time sleeping space (Banning & Köhler-Rollefson, 1986). Zone 2 comprises the space around the tent where the storage is located, the Laban is dried on the platform, the men's sleeping area and where the pens are placed. The utilisation of space within Bedouin camps is also influenced by cultural practices and rituals that shape social interactions and community dynamics. For instance, hospitality is a central value in Bedouin culture, and specific areas within the camp may be reserved for receiving guests and sharing meals (Simms, 1988). The tent is placed according to the wind and the sun, to create shade and block the wind (Simms, 1988). This represents cultural resilience, adaptability, and the capacity for harmonious coexistence with the desert environment.

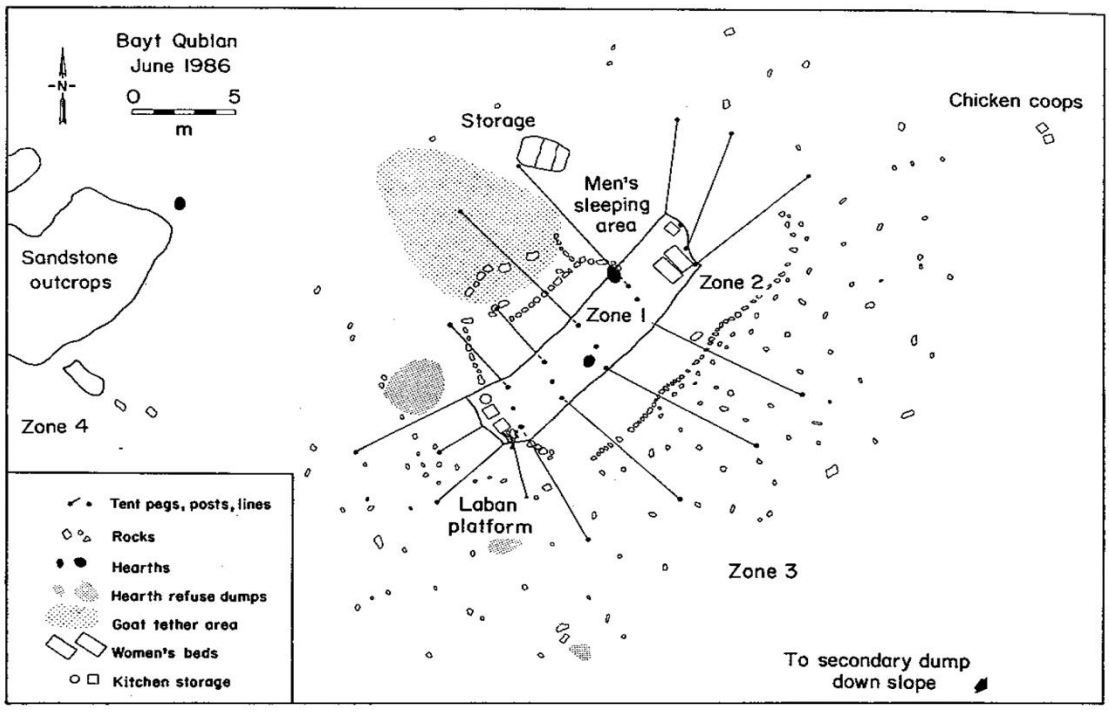

Figure 2 Map of a Bedouin camp "Bayt Qublan" in Petra Jordan showing four zones of activity (Simms, 1988).

Figure 4 The caves of the Bedul made by the Nabataeans in Petra Jordan (Bienkowski, 1985).

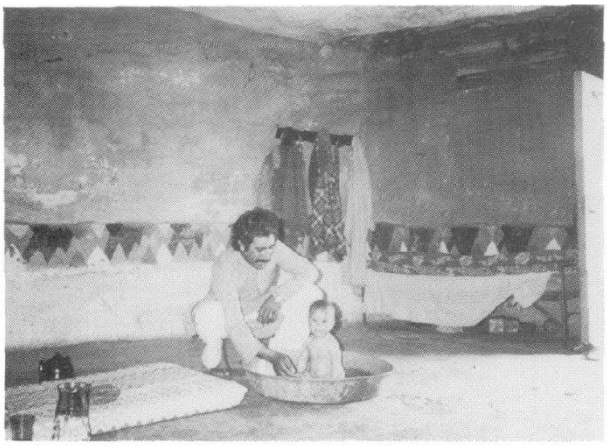

Figure 3 The living room inside the cave (Bienkowski, 1985).

Bedul caves

Some Bedouins reside in a single location for an extended period. The Bedul, a tribe of Bedouins residing in Petra, have established a more permanent presence in one area. They inhabit caves. These caves were made in the times of the Nabataeans, an ancient Arab tribe that inhabited the northern Arabian Peninsula before the arrival of the Bedul (Figure 3). These semi-nomadic individuals do not require frequent relocation for their survival. The dry region of Jordan, where they are located, is water scarce and thus of significant importance. This is why they install their camps near water. These Bedouins participate more in a wider economy. They work for the Ministry of Tourism in Jordan and sell artefacts to tourists (Bienkowski, 1985). Nevertheless, these Bedouins remain dependent on their food production. Bedouins in Petra have shaped the caves to their needs. The Bedouins' habitation in Petra Includes a variety of cave types, including permanent residential caves, occasional work caves, and seasonal tent occupation. The caves are adapted in simple but sophisticated ways, with overlapping uses that cannot be defined by a single function, but rather by seasonal occupation. Residential caves reflect a blend of practicality and comfort. The caves are for permanent occupation and consist of functional areas, like the living room, kitchen, and sleep area (Figure 4). In front of the caves, there is a garden where hollyhocks, tomatoes, and herbs are planted (Figure 5). The work cave is a smaller settlement and not permanent. The Bedul use it through the summer and it is situated near areas where the Bedul farm a small patch of land. This work cave consists of a kitchen living area and a sleeping area (Figure 6). There is also space outside for the goat's pen. Furthermore, the Bedul people utilise the tents for seasonal occupation (Figure 7). These tents are easily movable and can be constructed rapidly. They serve as a single space for the Bedul to live and sleep. Outside the tent, a fireplace and stove are used for cooking. The livestock is placed around the tent, and farming is conducted in this area (Bienkowski, 1985). In all three dwelling types, the space is not defined. The space is flexible and can be adapted to the needs of the users in specific seasons. This makes the space resilient to time, from the time of the Nabateaens until the Bedul, due to its flexibility. The Bedul have become semi-independent, self-reliant, and resilient to changes by farming their food, herding their livestock, and determining their own space. The Bedouins also rely on the natural environment for resources such as water, shade, and forage for their animals. Campsites are often situated in proximity to water sources, such as springs or wells, and natural features,

such as rock formations or trees, are utilised for shade and protection from the elements (Helms, 1990). The occupation of permanent caves is due to the necessity for comfortable and stable living conditions for women and children. The work caves are not permanent due to the continuous search for food and the demands of their herd and flocks. Similarly to the tents, they are also not long-term.

Figure 5 Residential cave, permanent occupation (Bienkowski, 1985).

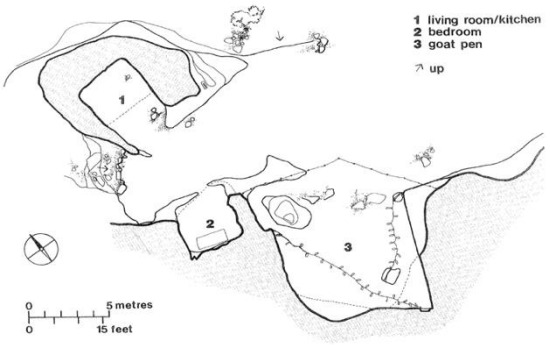

Figure 7 Work cave, occasional occupation (Bienkowski, 1985)

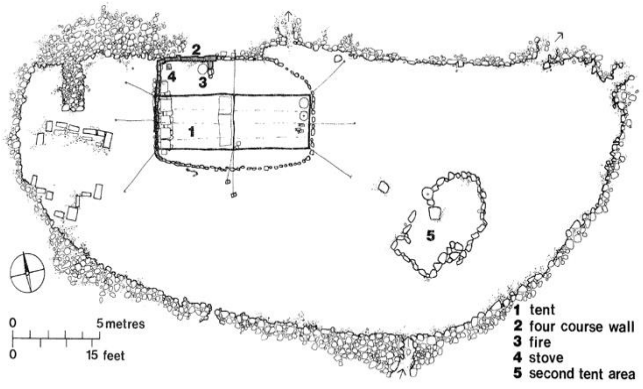

Figure 6 Tent, seasonal occupation (Bienkowski, 1985).

Contemporary movement by Bedouins

In Galilee, Palestine, the Bedouin are a semi-nomadic people. The population consists of diverse ethnic tribes. They have migrated from place to place over time for economic and political reasons (Figure 8). They were less self-sufficient and had to travel long distances to reach villages and marketplaces for commercial exchange (Falah, 1990). They were dependent on exchanges in the marketplaces for food and livestock (Figure 9). Because of the non-desert environment in Galilee, the Bedouins were able to stay in one place and become semi-nomadic. There is a relationship between the movement of Bedouins between 1980 and 1950 and the locations of the marketplaces where the exchange took place (Figures 8 & 9). The locations of the marketplaces are determined by the routes of the Bedouin movement. The weakness of the central government and the lack of significant economic development in Palestine played an important role in the survival of semi-nomadism. The low level of economic development contributed to the continuation of semi-nomadic life. The improvement of economic conditions, such as a new railway line between Haifa and Damascus, an example of a modern way of movement by train used by the Bedouins on the same routes they used before, has also influenced the continuation of semi-nomadic life (Figure 8). They didn't have to move as a whole community to survive. The rapid movement by the train allowed the Bedouins to become semi-nomadic. This transition is reflected in their settlements and their increasing attachment to permanent assets such as wells, caves and stone buildings. The Bedouins built stone houses, used stone houses to store grain, and made coarse mats for the walls and roofs of their huts (Robinson, 1867).

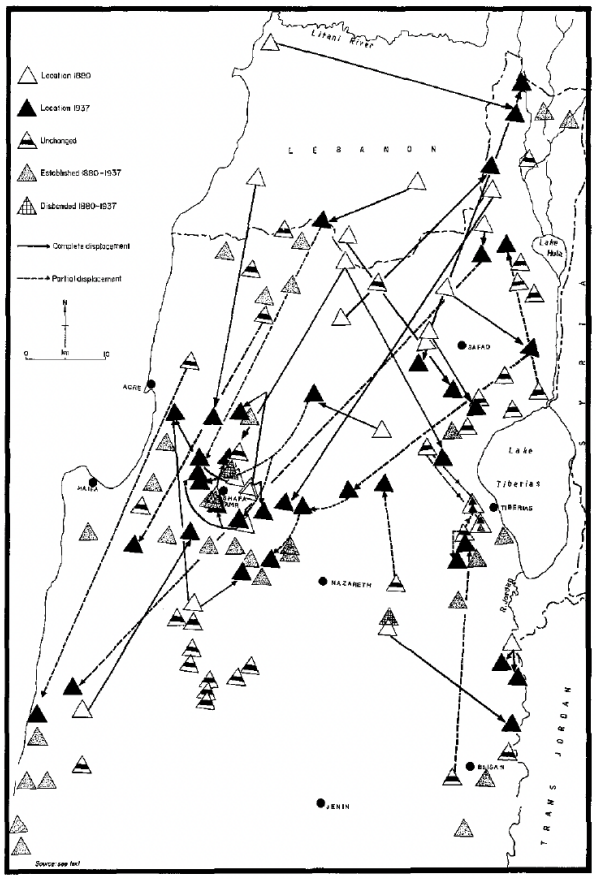

Figure 9 Change in tribal location in Palestine (Falah, 1990).

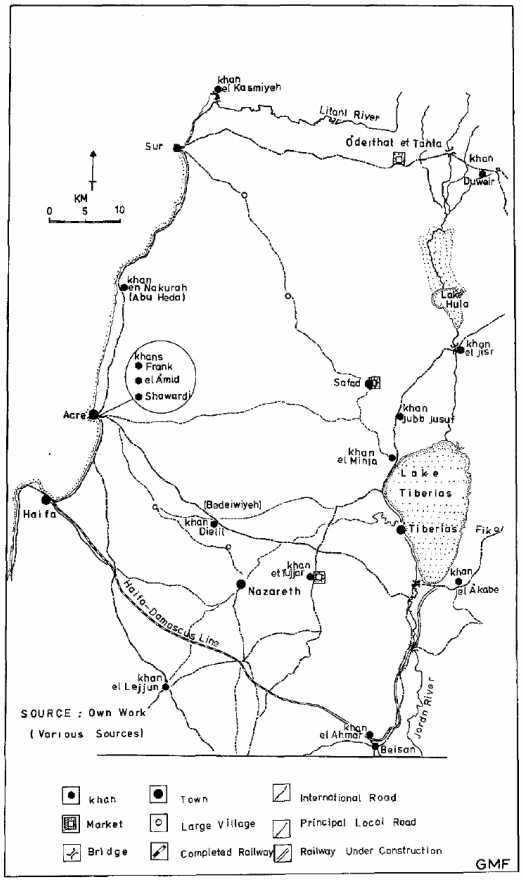

Figure 8 Khans and markets in Gelilee in Palestine (Falah, 1990).

Settled Bedouins

The Siwans are the more settled Bedouins of Siwa in the remote western desert of Egypt. Despite their settled location, they are descended from Bedouin generations and still maintain the Bedouin way of life. They have adapted to the extreme environmental conditions of the Sahara. This makes the Siwans and their architecture resilient to extreme environmental conditions. Siwa was a resting place for the travelling tribes in the desert, used by the tribes in the time of the Pharaohs (Ahmed, 2014). Now it is a permanent settlement. In response to the extreme heat of the desert, the dwellings in Siwa are compact, with a minimum surface area exposed to the sun. The alleys between the houses are often narrow to provide shade and ventilation (Figure 11). According to the Siwa, the vegetation next to the openings improves the cooling of the air. Wind towers and atriums are used in the houses to cool the rooms. Windows facing each other help in cross ventilation of the space and thus cooling the space (Ahmed, 2014). The functions of the dwelling are arranged around a central gathering area, which encourages social interaction between family members (Figure 10). The creation of an outdoor seating area for men encourages social interaction in the community. These dwellings are made from local materials, and built by local people, and the craft is passed on from one generation to the next. Using local materials, involving the local community and promoting local crafts promotes a better quality of life and a resilient community. According to Ahmed's interviews with the Siwans, the use of traditional architectural vocabulary makes people feel more connected to their settlement and therefore more resilient (Figure 12). This shows the importance of research into the conservation of the natural environment, with a particular focus on the relationship between the natural environment and cultural heritage. The positive impact of sustainable development projects on the local community, such as job creation, economic opportunities and gender equality, ultimately leads to a better quality of life for the Siwans.

Figure 11 Courtyard in front of the housing in Siwa in Egypt (Ahmed, 2014).

Figure 10 Narrow shaft creating shadow and cross ventilation (Ahmed, 2014).

Figure 12 Space in front houses encouraging social interactions (Ahmed, 2014).

Caravanserai

The Bedouin do not base their economy solely on the exploitation of their resources but diversify by breeding and rearing sheep, goats and cattle, and by engaging in agriculture, fishing, smuggling and other forms of entrepreneurship (Lancaster, 1981). They exchange these goods with the wider economy. Bedouins are not completely self-sufficient and independent in the desert. They connect with outside communities through a Bedouin station, a building called a caravanserai or 'khan'. The routes between the caravanserais in the region are the result of the tribal movement of the Bedouins in the region (Figure 9). The map of the Bedouin movement in Galilee (Figure 8) corresponds to the map showing the routes between the caravanserais (Figure 9). A caravanserai or khan is a resting place where travellers rest and exchange goods with other travellers and thus with other communities. Bedouins come into contact with other communities at various points along the trade routes, during seasonal migrations, at water sources and therefore also in the marketplaces around 600 AD. Oases and water sources are important meeting places where Bedouins interact with settled farmers, herders and other nomadic groups. These sites serve as hubs for social, economic and cultural exchange, as well as for replenishing water supplies and grazing livestock. Bedouins visit these marketplaces, or souks, in nearby towns or villages to buy and sell goods, exchange livestock, and exchange information. These marketplaces serve as important hubs of interaction between Bedouin nomads and settled merchants, traders and artisans.

Figure 14 Ruin of a caravanserai in Negev in Palestine (Galili, 2022).

Figure 13 Excavated site of caravanserai on a Roman trade route in Negev in Palestine (Galili 2022).

Layout caravanserai

Caravanserais are buildings built along the Bedouin trade routes in the desert (Figure 9). These buildings are multifunctional, being a palace, a residence, a castle and a caravanserai (Helms, 1990). These Bedouin stations served as important resting and trading points along trade routes, providing accommodation, food, water and other essential services to travellers and traders, particularly those crossing desert regions. There are rooms arranged around a central courtyard (Figure 15). The central courtyard is used for gathering and stabling camels and other pack animals. The rooms are for visitors and some are storage rooms. The courtyard is the place where goods are exchanged. It is also where the connection between the Bedouin and the travellers took place. The courtyard is connected to the outside by a single door on one side. Some caravanserais have defence towers (Figure 15). The purpose of defence towers is to protect the caravanserai from bandits, as most

caravanserais are remote. The purpose of these towers is to see who is coming towards the caravanserai and if there is any danger. Bedouin stations are often built using locally available materials such as stone, mud bricks, wood and palm fronds (Helms, 1990). These materials are chosen for their durability and suitability for the harsh desert environment. Khans are buildings dating back to Roman times and late antiquity. They are maintained by the local community that lives nearby (Helms, 1990). They are similar to dwellings built in Syria, where the chambers of the house are also arranged around a central courtyard.

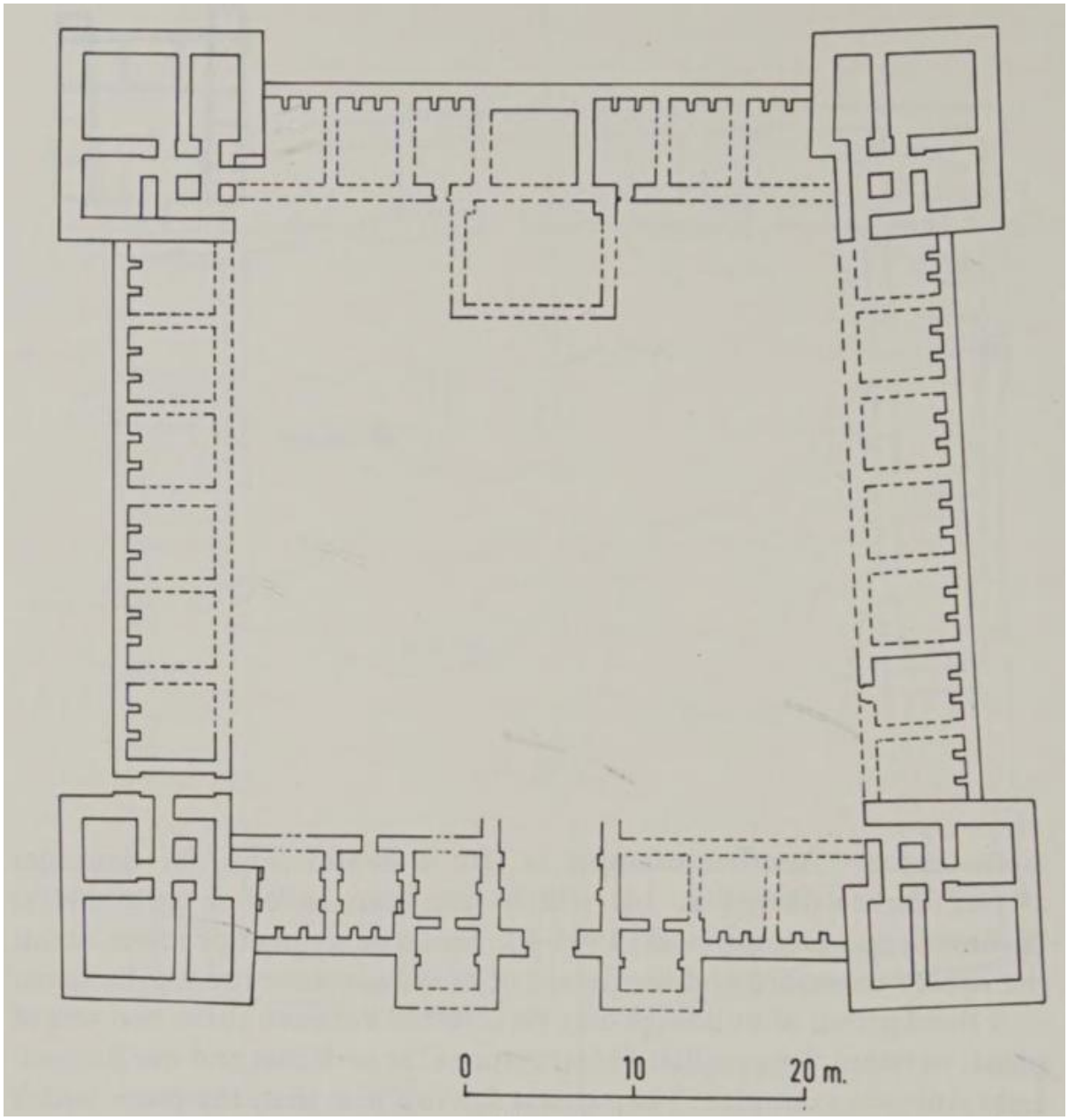

Figure 15 Khan consisting of rooms around a centered courtyard, plan (Helms, 1990).

The existence of the caravanserai in early Islamic times, around 600 AD, links communities and Bedouins across the desert. It stimulates local production and the local economy. The Bedouins depend on their production, even if they exchange it. The caravanserai was not the only place where goods were exchanged. It was a place where Bedouin communities

connected with outside communities and outside governments. Where the sheikh, the head of a community, is the negotiator between these Bedouin communities and the local government. Due to the nomadic lifestyle and the threat of raiding tribes, Bedouin stations often include defensive features such as high walls, watchtowers and fortified entrances. These features protect the inhabitants and their livestock (Helms, 1990).

Self-reliant in a resilient space

Bedouins live in a community and depend on their community for almost everything. This creates a sense of mutual dependence. Bedouin culture is rooted in a rich heritage of oral traditions, customs and social norms that promote resilience and self-reliance. This is seen by the Siwans in Egypt (Ahmed, 2014). Cultural practices such as hospitality, mutual aid and cooperation within extended family networks help Bedouins to overcome challenges and maintain social cohesion. This is reflected in the architecture of the common spaces they use and the connections they make through the extension of their dwellings, the garden. The garden is not only important but is multifunctional as well: in addition to being a meeting place with the rest of their community, it is a place where they grow their food and tend their livestock. The garden also acts as a barrier to the heat in the hot summer (Ahmed, 2014). The spaces within their dwellings are generic and can be adapted to their way of life and can be multifunctional, depending on the needs of the family living in the dwelling. This is evidenced by the use of caves throughout time, from the Nabataeans to the Bedul of today (Bienkowski, 1985). This makes the Bedouin resilient to changes in time and weather. In addition to a sense of ownership, it helps the inhabitants to feel at home and therefore resilient to change. Bedouin architecture is often organised in clusters or camps, with tents arranged around a central courtyard or open space. This communal layout encourages social interaction, facilitates the sharing of resources, and gives residents a sense of security and belonging. This translates into the concept of commoning in architecture, where the community takes control of its urban environment (Tan, 2015). Bedouins demonstrate efficient management of natural resources such as water, grazing land and fodder for their animals. They use sustainable practices to ensure the long-term viability of their pastoral livelihoods, including rotational grazing and the protection of water sources.

Nevertheless, the Bedouin depend on connections with the outside world, through Bedouin stations called caravanserais. These stations are the link between the community and the wider economic system, where they exchange goods and connect with other communities. This allows them to participate in a wider political and economic system, while still ensuring the harmony of their community. The architecture of Bedouin stations reflects the pragmatic needs and adaptive strategies of nomadic life. Portable tents, modular structures and defensive features are designed to withstand harsh environmental conditions and provide shelter, security and comfort for the inhabitants (Helms, 1990). This makes Bedouin architecture resilient to extreme changes.

These communities hold together, the individual is not vulnerable to extreme political and economic changes. The individual is dependent on the community and the community as a whole is dependent on the individuals and that makes the community self-reliant, creating an architecture that makes the individual, and therefore the community, resilient to extreme political and economic change. Similar to what commoning does in architecture. One for all and all for one.

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