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# Contents

# Abstract

Traditional vernacular architecture in the Arab world once fostered community and sanctuary, but modern developments have devolved it into an architecture that no longer fulfills present-day needs and disempowers rural populations. In Jordan, this paradigm shift ignited in the 1930s has led to a mass abandonment of traditional mud and stone houses in favor of contemporary concrete buildings.
The agricultural village of Al-Zamaliyyah, located in the Jordan Valley, exemplifies this shift from vernacular architecture shaped by local life to an imported typology of housing that does not sufficiently cater to community practices or individual needs. Paradoxically, despite the social and cultural costs, residents often favor these modern, concrete typologies due to internalized perceptions of what contemporary living should look like.

Drawing on Hassan Fathy's framework of contemporary architecture as an expression of time, place, and collective knowledge, this thesis examines how Al-Zamaliyyah's current built environment reflects the paradigm shift from tradition to modernity, and fails to meet the standards of Fathy's definition of "true contemporaneity". Through a literature review including testimonies from locals, ethnographic interviews, and an architectural analysis, it investigates why locals choose to live in modern concrete housing despite its social and climatic drawbacks, and how this understanding can contribute to the development of a new housing typology which achieves social and environmental sustainability.
By linking local narratives to architectural expressions, this study explores the tensions between tradition and modernization in rural housing. It evaluates the advantages and disadvantages of both vernacular mud and contemporary concrete typologies, compiling an index of key architectural features relevant to contemporary needs. These insights encourage the innovation of traditional and modern material systems to reconcile social and environmental values in Jordan's rural architecture. Applying the adaptive reuse concept of aemulatio, it examines how valuable traits from each typology can be copied and improved to meet contemporary needs.



CHAPTER 1

# Introduction

## 1.1. Author's Notes

I first dreamt of this thesis after joining the Earthen Architecture Documentation Initiative (EADI) in Jordan as it was formed by Mariam Al-Azzeh in May of 2024. Based on her years of mud research throughout the country, she suggested the first site visit of the group be to Al-Zamaliyyah, a small village of no more than 2,000 people[1] in the Northern Jordan Valley. With an estimated total of 431 households in the village by the end of 2024,[2] the village's remaining handful of mud houses came with a bad reputation in the media and from neighbors throughout the village. Yet as a group of professionals; architects, researchers, archeologists, and engineers, we found the houses inspiring. From scientific and heritage perspectives, we mused over the beauty, resourcefulness, and clear community resilience displayed in the houses. Still, observing their deteriorating states and listening to the warnings from their neighbors, it was hard to ignore the resentment expressed towards these traditional houses in Al-Zamaliyyah and beyond. This dissonance between attitudes towards mud is what inspired this thesis.

## 1.2. Introduction

Traditional vernacular architecture generates a landscape where "the buildings of any locality were the beautiful children of a happy marriage between the imagination of the people and the demands of their countryside."[3] Egyptian architect Hassan Fathy's poetic image of the vernacular affirms not only its geographical and environmental harmony, but its deep connection to its makers. In vernacular settings, this relationship between people and their environments holds a spiritual status that is in danger of total erasure at the unrelenting hands of change. Austrian-American architect Bernard Rudofsky, author of *Architecture without Architects*, highlights that "many audacious "primitive" solutions anticipate our cumbersome technology; that many a feature invented in recent years is old hat in vernacular architecture."[4] Rudofsky's use of the term "primitive" in quotation marks references the inherent categorization of non-western architecture as less evolved, implicitly suggesting a sophisticated Western alternative. This zeitgeist, although currently under reformation, establishes the problematic hierarchy positioning mud as an architecture of the poor in the east and global south, and conversely as a contemporary, exotic material in the West. From more contemporary Western perspectives, interest in mud architecture is visible in the exploration of mud as a sustainable material in works by Martin Rauch and BC Architects. This interest suggests the reformation of the existing hierarchical attitudes towards mud in architecture. In the Western context, the attitude towards mud particularly among architects today can be described as curious.

1 *Population Estimates at the End of 2024*, Jordan Department of Statistics: Population and Social Statistics, 2025, 19. https://dosweb.dos.gov.jo/DataBank/Population/Population_Estimares/PopulationEstimatesbyLocality.pdf

2 ibid

3 Hassan Fathy, *Architecture for the Poor: An Experiment in Rural Egypt* (The University of Chicago, 1973), 19.

4 Bernard Rudofsky, *Architecture without Architects: A Short Introduction to Non-Pedigreed Architecture* (New York: The Museum of Modern Art, 1964), 5.

In the Arab world however, even the majority of architects regard mud as outdated, fragile, and emblematic of poverty. Modernization is equated with concrete, and its negative climatic impacts are overshadowed by the industrial availability of both knowledge and materials. Traditional methods on the other hand are stigmatized despite their ecological benefits, allowing only for a niche of mud appreciation within the architectural realm. In light of this situation, Fathy highlights the importance of considering truly contemporary architecture, advocating for the inclusion of traditional practices in modern architecture.[5] This philosophy, Fathy's idea of contemporaneity, forms a key concept on which this thesis is based as it aims to develop a true contemporary form of rural housing, amassing the collective knowledge of humanity, both traditional and modern.

Despite the general perception of vernacular mud architecture as a socio-economic artifact of the past, especially in developing countries like Jordan, its materials and associated practices offer a practical solution to environmentally friendly, climate resilient architecture. As global climates reach unprecedented extremes, climate mitigation measures become even more dire. In Jordan, where climate change gravely impacts the lesser affluent, the need for climate-resilient housing is urgent. As a developing country, the people, particularly in rural areas often lack access to high-tech solutions attributed to climate resilience in developed countries. The Jordan Valley, one of the most vulnerable areas to climate change in the region, faces extreme heat and volatility in rain patterns. Historically, its villages achieved self-sufficiency through stone and mud architecture with passive cooling, thermal mass, and local availability of materials. Beyond environmental factors, the transition from mud to concrete reflects deeper cultural changes. Traditional mud construction was a communal activity, reinforcing social bonds and shared knowledge through the concept of *ouneh* (reciprocity). The social practice of *ouneh* extended to maintenance, which was a collective responsibility ensuring that buildings evolved with their inhabitants. Related to the Modern Standard Arabic term, *oun*, meaning aid or help,[6] the practices associated with *ouneh* include collective forms of maintaining communal autonomy through farming, gardening, and building construction and maintenance.

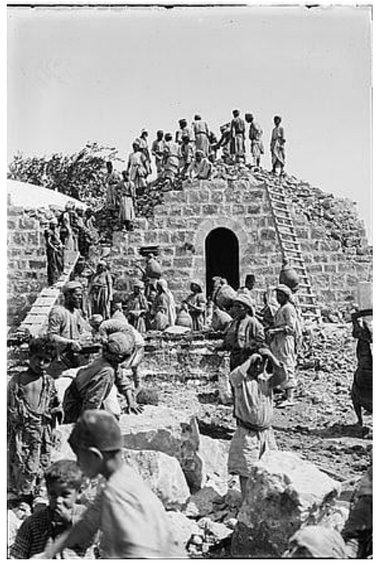


Fig. 1. Practice of *Ouneh* in Construction

Over the past few decades, concrete has entirely replaced mud, driven by perceptions of modernity, permanence, and social status. Concrete, by contrast, is professionally built, severing the link between residents and their homes. The shift has led to a decline in vernacular building skills and a loss of architectural agency. Moreover, while concrete is perceived as modern, the standardization of its practices and applications often fails to meet local physical and social needs. The placelessness of concrete causes a lapse in tacit understanding and emotional connections that come with mud architecture in the region. Traditional planning features such as adaptable spaces for cultural activities or passive cooling strategies are easily forgotten.
The resulting issues are not merely technical, but cultural. The prevailing social stigma surrounding mud architecture must be shed to prove its relevance in the valley's changing climate. In this way, the developed typologies must reflect a bottom up approach, gradually reviving the traditional sense of social sustainability. By adapting and applying the emerging adaptive reuse principle of

5 Hassan Fathy, "Contemporaneity in the City," In *Architecture for a Changing World*, edited by James Steele (London: Academy Editions, 1992). https://www.archnet.org/publications/3710

6 Hans Wehr, *A Dictionary of Modern Written Arabic*, edited by J Milton Cowan (Spoken Language Services Inc.,U.S., 1976). https://ia803408.us.archive.org/3/items/dictionary-of-modern-written-arabic-hans/Dictionary_of_modern_written_Arabic_Hans.pdf



aemulatio, copying and improving existing local practices for contemporary needs, this thesis seeks to ultimately develop a housing model that is both of its place and of its time, one that respects tradition without rejecting progress. In doing so, it offers a potential solution for rural communities worldwide facing similar tensions between heritage and modernity.
To do so, this thesis investigates Al-Zamaliyyah, a small agricultural village in the Jordan Valley, as a microcosm of this global shift. Once a community where mud houses fostered social cohesion and environmental harmony, Al-Zamaliyyah now exemplifies the tension between tradition and modernity. While concrete offers immediate practical benefits such as durability and ease of construction, it also exacerbates long term environmental degradation and cultural detachment. Meanwhile, traditional mud architecture, though environmentally optimal, is rejected due to its association with backwardness.

As such, this thesis seeks to answer the question: How can vernacular architecture be traced and adapted to form a true contemporary rural housing typology which balances tradition and modernity for socially and climatically resilient architecture?

### 1.3. Methodology

The study employs a multidisciplinary methodology including:

1. **Literature Review**: Reviewing existing literature on the values of mud architecture and the regional shift towards concrete.
2. **Architectural Documentation and Analysis**: Mapping Al-Zamaliyyah's current mud and concrete houses, identifying advantages and disadvantages of each material system. Ethnographic interviews including oral histories and local narratives from community members are analyzed to understand why mud is so disfavored and what the people seek in future housing.
3. **Indexing**: Summary and organization of contemporary needs reflected in architectural features.
4. **Design Prototyping**: Proposing a series of hybrid housing models that merge the benefits of mud and concrete, encouraging the gradual reclamation of mud architecture in the rural context.

The thesis is organized into six chapters, each of which is introduced by an influential quote compiled either during the research process or from stories and literature that have shaped my worldview.
Chapter 2: "State of the Arts: Mud in Context", explores the current status of mud in architecture in the Arab and Western worlds, noting the key differences and current developments.
Chapter 3: "The Northern Jordan Valley: Changes in Climate and Culture", provides a background on the environmental, cultural, and architectural setting of the Northern Jordan Valley, particularly in relation to the changes it has undergone and continues to undergo.
Chapter 4: "Towards Materialism", addresses the historic relationships between village and government to understand the shift towards capital-based lifestyles and highlight the value of autonomy. Then, it explores Egyptian mud architect Hassan Fathy's philosophies around tradition and the need for a true contemporary to learn from past mistakes.
Chapter 5: "Al-Zamaliyyah: Village Analysis", the foundation established in Chapter 4 is exemplified in an analysis of the village's local narratives and architectural morphology to investigate the local attitudes towards mud and concrete. Social stigmas related to vernacular features, particularly with mud as a construction material, are taken into account to ensure contemporary needs, including social and environmental sustainability, are met. This requires identifying and addressing its perceived weaknesses such as durability concerns, maintenance demands, and social perceptions while amplifying its strengths in sustainability and autonomy.
Chapter 6: "Design Approach", discusses and applies the theoretical adaptive reuse framework of aemulatio to the case of traditional mud and modern concrete architecture, working towards a true contemporary housing typology for the village.

CHAPTER 2

# State of the Arts
# Mud in Context

*Mud is velvet, when dry and when wet. It is the extension of the very skin of the landscape.*[7]

(Khammash, 2003)

## 2.1. Mud in the Arab World

The modern history of mud in the academic and professional world can be largely attributed to the work of Egyptian architect Hassan Fathy. His most notable work includes the design and implementation of the New Gourna village in Luxor, Egypt, and his related book detailing the village's design and construction processes, *Architecture for the Poor: An Experiment in Rural Egypt*.[8] The project came at a time when colonial rule and globalization encouraged Western notions of modernism, particularly in rural settings where mud was most dominant. As each village was seen by the government to represent a microcosm of the country, they became the main target of larger attempts at modernization.[9] Considering that this period coincides with the post-war reconstruction of the West and shared goals to "build inexpensively with speed",[10] traditional materials like mud would be effectively marginalised in favor of industrial materials like concrete and steel. Through New Gourna, Fathy's response was to revive a variety of traditional architectural practices surrounding mud architecture including the ancient Nubian vault, to improve both autonomy and standards of living.[11]

Although Fathy's work was not successful in overcoming the hegemony against mud architecture, it has propagated architectural interest in the material within the Arab world and beyond. His works contribute to global references for vernacular and mud architecture including Paul Oliver's *Encyclopedia of Vernacular Architecture of the World* (1998) and Jean Dethier's *Down to earth: Adobe Architecture, an Old Idea, a New Future* (1983). In the Arab world, architects and researchers such

7 Ammar Khammash, "Life in Mud". Khammash Architects, 2003. https://www.khammash.com/research/life-mud

8 Fathy, Architecture for the Poor.

9 Omnia El Shakry, The Great Social Laboratory: Subjects of Knowledge in Colonial and Postcolonial Egypt (Stanford, CA: Stanford University Press, 2007).

10 Mohamed Shaker, "Comfortable Modernization: Hassan Fathy's Architecture and the Decolonization of Egypt," PhD diss., (University of California, 2019), 65. https://escholarship.org/content/qt2d35844k/qt2d35844k_noSplash_a44befa1e6e9b8597823a806e2489509.pdf?t=q2peli

11 Fathy, Architecture for the Poor, 6.

Fig. 2. Malhas' Mud House Exterior

Fig. 3. Malhas' Mud House Landscaping

Fig. 4. Malhas' Mud House Interior

as Salma Samar Damluji[12] and Mariam Al-Azzeh dedicated to documenting the mud architecture of Yemen and Jordan respectively. Under Fathy's guidance, Egyptian architect Abdel-Wahed El-Wakil also worked with mud, arguing for the role of the architect in restoring traditional values of spirituality in built environments.[13] In a critical examination of Modernism and other "International styles", El-Wakil turns to tradition to "establish the permissible rate of change within the spatial environment."[14]

In the southern Jordan Valley, architect Amani Malhas has built the only known case of a contemporary, formal mud house in Jordan to date. Her formal education had involved a critical regionalist approach where she studied under architect Friedrich Ragette to help understand and define the Lebanese traditional typology in *Architecture In Lebanon: The Lebanese House During The Eighteenth And Nineteenth Centuries in the 1970s*.[15] This background, supplemented by the teachings of Fathy, allowed Malhas to design the mud house through trial and error and word-of-mouth knowledge from hired laborers. The house, built in the 80s, was centered around Malhas' appreciation of local contexts in the built environment. This appreciation prompted her visits to the nearby village and inspired her utilization of mud and vernacular forms, although the scale of the house surpasses the local mud houses, which are usually a simple one or two rooms. Malhas had believed that her formalization of the vernacular would inspire the villagers to take pride in their own houses, shattering the local taboo equating mud houses to poverty. However this was not the case, and her choice to build in mud was questioned and critiqued by locals.[16] At this point, the architecture of Jordan was being transformed by international influence. Houses were using imported features like pitched roofs and red tiles as a status symbol.[17] Yet, Malhas' mud house gained the attention of the country, most notably from the King himself who attended the opening ceremony of the house. While the house has been the "talk of the town", receiving hundreds of visitors, the project was the last of its kind. Political and social attitudes towards mud, beyond the artistic and architectural, discouraged its use in practice. Malhas notes that her close ties to the client and their social and financial status are what allowed the mud house to be built.[18]

This case is emblematic of the present status of mud architecture in Jordan. Similarly to Egypt, it has evolved to a contradictory hierarchy where mud is seen among the extreme upper and extreme lower classes, and those in between build "what is closer to Le Corbusier's domino house than Fathy's mud brick domed village houses", as described in an article originally published by *The Cairo Observer*.[19] Research from the Jordan University of Science and Technology distinguished the opposing motivations between the upper and lower classes in using mud. People who use mud for "luxurious villas" are "very far from the realities of the life of the low-income groups", their choice based on a "love of tradition and its continuity."[20] The low income groups, on the other hand, build in mud unwillingly and out of necessity and in no way benefit from the use of mud among the upper class.

In assessing the adaptive reuse challenges of mud and other heritage buildings in Jordan in 2023, research determined that the "foremost impediment[…]revolves around the scarcity of skilled and qualified restoration contractors in Jordan."[21] Slowly, this is beginning to change. The recent reconstruction of a mud house roof in Mafraq, Jordan using traditional techniques represents the growing valuation of contemporary mud applications. The associated Boro'om project aims to "improve income access for vulnerable Jordanian and Syrian refugee populations" through specialist training in traditional construction techniques, "building local capacity and enhancing community resilience."[22]

## 2.2. Mud in the West

The current appreciation for the vernacular, including mud architecture, seems to have been catalyzed by Austrian-American architect Bernard Rudofsky in 1964 with the publication of *Architecture without Architects*.[23] The museum exhibition and subsequent book highlight the art of building with, rather than against, nature, and in turn, how to "live and let live"[24] through categorizing photographs and brief descriptions of various vernacular design philosophies. Although honoring indigeneity was

12 See *The Architecture of Yemen and Its Reconstruction* (2021).

13 See "The Mosques of Abdel Wahed El-Wakil". https://mosqpedia.org/wp-content/uploads/2024/09/ACYNQg37yDIn6DrBjYFVuK2g-Ty6ZQsQ69Ag53H1j.pdf

14 Abdel Wahed El-Wakil, "Identity, Tradition, and Architecture: A Critical Treatise from the Archive of Abdel-Wahid El-Wakil," EastEast. https://easteast.world/posts/504

15 Friedrich Ragette, *Architecture In Lebanon: The Lebanese House During The Eighteenth And Nineteenth Centuries* (Delmar, NY: Caravan Books 1980).

16 Amani Malhas, Interview by Author, April 28, 2025.

17 Rami Daher, "Domesticated Modernity: Ammani's Architects of the 1950s, Breaking the Traditional Box." (class lecture for Heritage Conservation and Management, German Jordanian University, Amman, Jordan, May 23, 2021).

18 Amani Malhas, Interview by Author, April 28, 2025.

19 "Hassan Fathy and the Architecture for the Poor: The Controversy of Success," Archidatum, accessed April 06, 2025, https://www.archidatum.com/articles/hassan-fathy-and-the-architecture-for-the-poor-the-controversy-of-success/

20 *Proceedings of the Symposium on Low Cost Housing in the Arab Region, Sana'a, 28-24 October 1992, Volume I, Volume II* (Amman: United Nations Economic and Social Commission for Western Asia (ESCWA), 1993), 126.https://digitallibrary.un.org/record/1292240?ln=en&v=pdf

21 Zayed Zeadat, "Adaptive Reuse Challenges of Jordan's Heritage Buildings: A Critical Review," *International Journal Of Urban Sustainable Development 2024*, Vol. 16, no. 1 (March 2024): 101. https://doi.org/10.1080/19463138.2024.2329661

22 "Boro'om Project," Selajo, accessed April 23, 2025, https://selajo.org/en/projectdtls/38/Boro%E2%80%99om-project

23 Rudolfsky, *Architecture Without Architects*.

24 ibid, 6

not an entirely new concept, it was exceedingly relevant in offering an alternative to the growing dissatisfaction with modernism and international architecture.[25]

Since Rudolfsky's work in the 60s, interest and knowledge in vernacular architecture has continued to grow. In a contemporary and more detailed approach to building with nature, The Pavilion of Slovenia, "+/- 1°C In Search of Well-Tempered Architecture", at the 2023 Venice Architecture Biennale outlines five energy principles based on vernacular architecture in response to climate change.[26] These principles reflect on the social and climate responsive nature of the vernacular, the "hot spot" for example referring to the social and functional tradition of gathering around a central heating or cooling system. In the Arab context, this may apply to cooling features such as central fountains, windcatchers, or irrigation channels that run inside households to retain cool indoor temperatures. The "intermediate zone" is defined as an extension of the facade, providing both a temperature buffer and additional space for utility.[27] In warm climates, transitional spaces such as the iwan, courtyard, and arcades provide a similar function. Other principles relate to transforming spaces for strategic and efficient heating, highlighting the importance of the human scale ("cocoon") and transformability of spaces ("room within a room" and "spatial compression") in seasonal solutions.[28] Centralizing such obvious yet forgotten principles as climate solutions works to establish a background of understanding and pave the way for the appreciation of traditional wisdom.

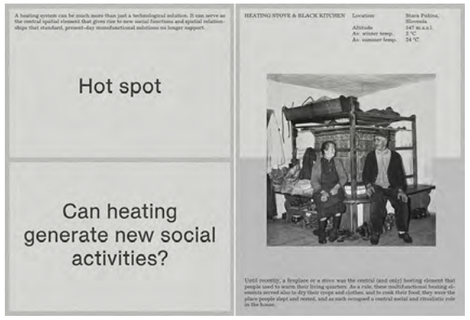



Fig. 5. Hot Spot Energy Principle from the Pavilion of Slovenia

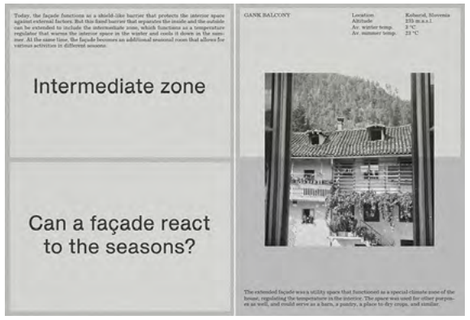



Fig. 6. Intermediate Zone Energy Principle from the Pavilion of Slovenia

In 2020, Belgian architect Jean Dethier's publications including an *Architectural Review* essay, "Inhabiting the Earth: a New History of Raw Earth Architecture," began shedding light on the contemporary value of raw earth in architecture's "essential civic and ethical duty to fight against the climate crisis".[29] In this essay, he emphasizes the absence of both traditional and contemporary forms of mud architecture in recent literature, producing a general lack of "reliable information about the future uses of this natural resource as a locally sourced and ecologically sustainable building material."[30] He cites cultural amnesia as the reason for the negligence of mud's "true diversity, quality, and modernity", hoping that restoring this lost knowledge would facilitate its

25 Jean-François Bédard, "Lessons from Bernard Rudofsky," *Journal of the Society of Architectural Historians*, Vol. 67, No. 2 (June 2008), 277. https://doi.org/10.1525/jsah.2008.67.2.277.

26 "Interview: Slovenian Pavilion Reimagines Ecology in Architecture at Venice Biennale," Designboom, October 19, 2023, https://www.designboom.com/architecture/interview-slovenian-pavilion-reimagines-ecology-in-architecture-venice-biennale-10-19-2023/.

27 ibid

28 ibid

29 Jean Dethier, "Inhabiting the Earth: A New History of Raw Earth Architecture," *The Architectural Review*, January 31, 2020, https://www.architectural-review.com/essays/inhabiting-the-earth-a-new-history-of-raw-earth-architecture.

30 ibid



contemporary use in "both emerging and industrialized countries."[31] The publication of his book, T*he Art of Earth Architecture: Past, Present, Future*, in 2020 catalogued a wide range of examples of mud architecture and comments on its social and environmental functions throughout the world.[32] It has drawn attention to the diverse history of mud as a construction material ranging from the wattle and daub buildings of Europe to the monumental mud brick buildings of Yemen and Mali. The book provides a nuanced understanding of the history of mud throughout the world, and how this impacts its modern day applications. It is worth noting here the general preference for the term earth in Western literature, versus the Arabic mud or *teen*. While earth elicits a more refined image, mud holds the association of dirtiness, mirroring the varying perceptions of the material in the two contexts.

In the book's chapter four, "The Vernacular Spirit and the Builders of Today", Hubert Guillaud outlines the growth of the vernacular in mainstream architecture since Rudolfsky's exhibition, yet acknowledges the hurdle architects face in using "natural local materials" as "technocratic and supposedly scientific rules and regulations[…]ensure the universal domination of industrial construction materials."[33] The book highlights two contemporary voices, rammed earth specialists Martin Rauch and Anna Heringer, who are working against these regulatory setbacks.

Rammed earth, in comparison to mud brick architecture, is less common in traditional and contemporary Arab architecture for its labor and material intensity. However, its durability, refined image, and prefabrication potential have made it the technique of choice for Austrian ceramist Martin Rauch. Rauch is considered the 'godfather' of rammed earth in Europe[34] for his work standardizing earthen constructions and developing prefabricated earthen structures to facilitate mud architecture in line with the constraints of European construction standards.[35] His work has proven successful in combating stereotypes of earth as a delicate material, arguing that when done correctly, rammed earth can withstand even Austria's cold, wet climate. The Rauch house, built under the supervision of Rauch himself between 2005-2008[36] is perhaps one of the most commonly known examples of contemporary earthen architecture in Europe. Rauch expresses his feelings towards earthen architecture through his experiences with his house, the "quality of life," the security, familiarity, and physical comfort it affords him.[37] He advocates for the acceptance and widespread application of raw earth under a new "body of rules" that facilitate such innovations in contrast to the "current stifling and overly rigid directives."[38] The

Fig. 7. The Rauch House

31 ibid

32 Jean Dethier, *The Art of Earth Architecture: Past, Present, Future* (New York: Thames & Hudson, 2020).

33 Dethier, *The Art of Earth Architecture*, 154

34 Jakob Schoof, "Gone to Earth: Unstructured Web Magazine Features Martin Rauch," DETAIL, Aug. 24, 2016, https://www.detail.de/de_en/gone-to-earth-unstructured-web-magazine-features-martin-rauch-28351

35 ibid

36 "Rammed Earth House in Schlins," Lehm Ton Erde, accessed March 14, 2025, https://www.lehmtonerde.at/en/projects/project.php?pID=7.

37 Dethier, *The Art of Earth Architecture*, 482

38 ibid

image of his house has come to redefine perceptions around rammed earth as a contemporary material not reserved solely for the "poor" or "primitive". In producing a standard of beauty surrounding mud buildings in industrialized countries, Rauch hopes that "people in developing countries will be encouraged to follow suit" reconnecting with "ancient skills and identities and will be empowered to create contemporary versions of raw earth architecture."[39] While Rauch's approach has popularized rammed earth throughout the West and upper-classes of the non-west, it is divorced from the image of the more easily accessible mud brick, whose rough shape still holds negative associations of poverty.

German architect Anna Heringer's approach to rammed earth applies itself more in the non-western, hot-humid contexts of Bangladesh and India. Through her work, Heringer highlights the value of mud as a tool that "supports social justice and keeps our planet healthy."[40] In contrast to Rauch, Heringer leans into the architectural freedom granted by mud in terms of locality, financial accessibility, and user participation. This approach is often limited to certain geographies due to questions of social acceptance, labor availability, maintenance needs, and strict building regulations. These factors currently mark a subject for exploration in the context of contemporary Europe, where regulatory work is necessary for the widespread adoption of mud architecture including rammed earth.

In Belgium, BC Architects and Studies' recent work has begun to address this task, indicating a rise in scientific and sustainability-based interest in mud architecture. Their research indicates that Belgians today regard mud brick as a "traditional or unstylish" material when unfinished.[41] Building on the region's own rich history with mud,[42] new research and applications primarily revolve around adapting the mud itself for modern commercial use. New materials such as hempcrete (Fig. 8) are applied similarly to the traditional method of wattle and daub.[43] This reflects the need for a modernized form of mud construction which avoids the downsides of the material, namely the need for maintenance in exterior applications which limit the applicability and general perception of mud in the West. BC Materials (of BC Architects) has maintained the idea that mud is best suited for interiors in climates such as Belgium's, and has developed a system sourcing and standardizing mud products for commercial distribution.[44] This work improves the contemporary applicability of mud, especially within the confines of building regulations and capitalism.

Fig. 8. Hempcrete Wall by BC Architects at USquare Feder

39 ibid

40 James Parkes, "Five buildings that demonstrate the "beauty and sustainability" of Anna Heringer's work," dezeen, April 15, 2022, https://www.dezeen.com/2022/04/15/essential-beauty-anna-heringer-round-up/

41 Nathan Van Den Bossche, Nathan Van de Voorde, and Marijke Steeman, "Material Evaluation of Earth Block Masonry in the Context of Belgium: A Survey," *IOP Conference Series: Earth and Environmental Science* 1363, no. 1 (2024): 012099, 11 https://doi.org/10.1088/1755-1315/1363/1/012099.

42 See *Bokrijk Landelijke architectuur in beweging* (2024).

43 See Usquare Feder by BC Architects and Studies https://bc-as.org/projects/usquare-feder.

44 Farah Fervel, Tour of BC Material Office organized for UHasselt Study Visits, (Brussels, BE, April 2, 2025). See "BC Materials Resources" *https://bcmaterials.org/resources*



The gap between science-led and people-led mud architecture has led to a divide in what architect Fred Scott refers to as the "literate" and the "vernacular."[45] In mud architecture, the vernacular, a "spontaneous folk art…beyond the reach of the critical",[46] can be used to describe the self-made homes of villages like Al-Zamaliyyah. The literate, on the other hand, refers to the professionals and experts such as BC architects and Rauch who work to innovate mud for broader contemporary purposes. While the efforts of the literate are necessary for overcoming institutional regulations, it often risks polarizing the material as mud for the elite and mud for vernacular use, alluding to two very different applications. In the capital based societies of both the Arab world and the West, the normalization of mud architecture through such top down approaches will likely further the divide between the literate and the vernacular. Yet, this might be necessary in achieving the shared goal of both Rauch and Malhas, to break the taboos of building with mud.

Fig. 9. Compressed Earth Block 90 by BC Materials Interior Use

45 Fred Scott, "The Literate and the Vernacular," chap. 2 in *On Altering Architecture* (London: Routledge, 2008).

46 ibid, 38

# The Northern Jordan Valley
## Changes in Climate and Culture

*God*
*Is both creative and destructive,*
*Demanding and yielding,*
*Sculptor and clay.*
*God is Infinite Potential:*
*God is Change.*[47]

(Butler, 1993)

The social and architectural composition of the Jordan Valley is centered around its semi-arid climate. Agricultural and building practices aim to cope with the land's low levels of sporadic rainfall and high temperatures while the regional traditional architecture was designed for climate resilience.[48] Indigenous practices have allowed people to thrive in such an extreme environment while facilitating culturally appropriate interactions. However, as Jordan faces intensified effects of drought, desertification, flash flooding, and poor soil conditions through climate change,[49] the need for climate resilience and a shift towards sustainable construction is highlighted. Research confirms that farmers are among the most aware groups surrounding climate change in Jordan,[50] and shared experiences of climate events in Al-Zamaliyyah highlight this reality as memories of flash floods pervade the village's collective memory.

Yet, climate action is limited by dissonance between governmental and civil bodies. Social and political movements which may arise throughout the civil society often evade Jordan's working class, which remains occupied by the everyday struggles of sustaining life in poverty. As such, climate responsibility is relinquished, often unknowingly, by the people to policymakers and the rich.[51] As the working people remain unaware or unconvinced about their potential for climate solutions, top down approaches create further climate action dissonance. Additionally, several external attempts pushing for sustainability in Jordan have been rejected for ties to green colonialism. The EcoPark in the Jordan Valley for example, just four kilometers from Al-Zamaliyyah, faces boycotts by locals for

47 Octavia Butler, *Parable of the Sower*, (United States: Four Walls Eight Windows, 1993).

48 A. Rasem Hasan et al., "The Effect of Temperature and Rainfall Changes on Biophysical and Socio-Economic Status of People in Northern Jordan Valley Drylands, Palestine," *Climate Change Adaptations in Dryland Agriculture in Semi-Arid Areas* (February 10, 2022): 43–63, https://doi.org/10.1007/978-981-16-7861-5_4

49 ibid

50 Imad El-Anis and Marianna Poberezhskaya, "Responding to Climate Change in Jordan: understanding institutional developments, political restrictions and economic opportunities," *British Journal of Middle Eastern Studies* Volume 52, 2025 - Issue 2 (Nov 07, 2023): 335-353, https://doi.org/10.1080/13530194.2023.2279332

51 ibid

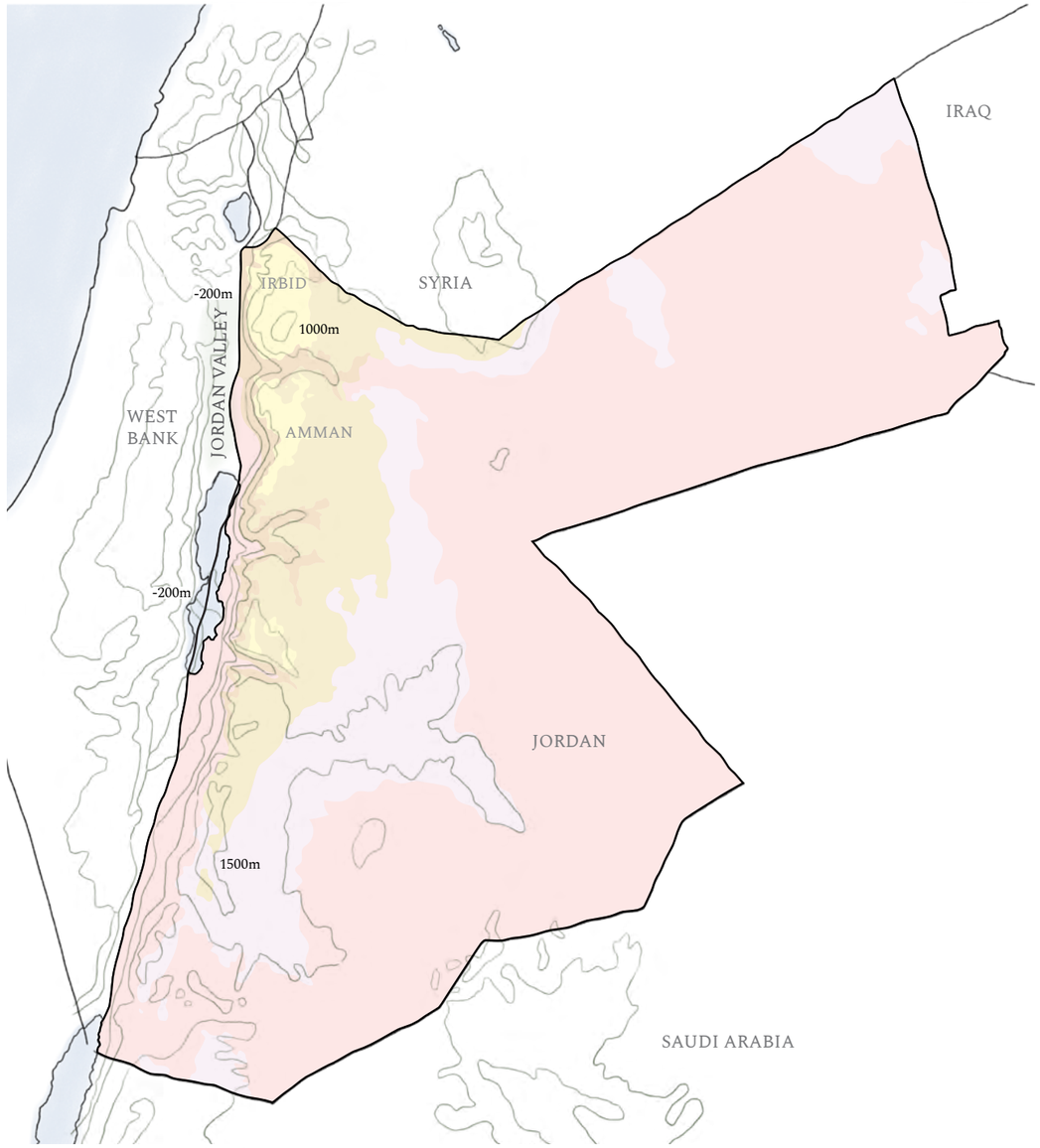


Fig. 10. Climate Map of Jordan



its affiliation with Israel.[52] Locals argue that the park promotes green washing and normalization of Israeli ties amid the ongoing conversation about the illegal Israeli occupation of Palestine and its subsequent genocide.[53] In addition to such cases where climate solutions linked to external bodies foster distrust, projects within Jordan leave affected people unsatisfied. In the context of Al-Zamaliyyah, some families receiving assistance from the National Aid Fund hold the limited governmental assistance accountable for their experiences of climate stress. Given the dwindling availability of water in the Valley, Malhas stresses the importance of bottom up initiatives, recognizing that previous attempts to introduce new typologies have failed because external ideas were imposed on, rather than generated among the villagers.[54]
To better understand this, the following sections address the current climate of the Jordan Valley and its predicted changes. Continuing on the broader topic of change, the regional culture and the change in material values are briefly analyzed.

### 3.1. Climate and Climate Change

The majority of Jordan is classified as a BWh (hot desert climate) according to the Köppen-Geiger classification system,[55] while most of the country's population lives within its CSa (Hot-summer Mediterranean climates) zone.[56] The Jordan Valley, with relatively high average temperatures and rainfall,[57] is classified as a BSh (hot semi-arid climate). The Valley has a mild diurnal cycle. In summer, the average high is 34°C, and the average low is around 27°C. The average high temperature in winter is around 15°C, and the average low is around 9°C.[58] Average annual rainfall ranges between 100-300mm in the Valley, compared to 300-600mm in the Western Highlands which form the Valley, and under 50mm in the country's eastern desert, the Badia.[59]

Agricultural settlements of varying sizes have existed as early as the Neolithic period in the Jordan Valley, typically situated strategically along streams descending from the highlands to the valley floor, utilizing the available water resources for agriculture.[60] Today, the valley's villages are among the most vulnerable to climate change in the country.[61] People throughout the valley are already experiencing the intensified effects of drought, desertification, flash flooding, and poor soil

52 Raya Tarawneh,"Social media activists call for EcoPark boycott" Jordan Times, Jun 01,2021, https://www.jordannews.jo/Section-109/News/Social-media-activists-call-for-EcoPark-boycott-3661

53 *Application of the Convention on the Prevention and Punishment of the Crime of Genocide in the Gaza Strip (South Africa v. Israel)*, Application Instituting Proceedings International Court of Justice, December 29, 2023, https://www.icj-cij.org/sites/default/files/case-related/192/192-20231228-app-01-00-en.pdf.

54 Malhas, interview

55 Hylke E Beck et al., "Present and future Köppen-Geiger climate classification maps at 1-km resolution," *Scientific data* 5, 180214. https://doi.org/10.1038/sdata.2018.214

56 Myriam Ababsa, "Changes in the Regional Distribution of the Population," In *Atlas of Jordan*, edited by Myriam Ababsa, (Beyrouth: Presses de l'Ifpo, 2013), https://doi.org/10.4000/books.ifpo.5021.

57 "Geography and Environment," The Official Website of His Majesty King Hussein I (Hashemite Kingdom of Jordan), accessed April 10, 2025, http://www.kinghussein.gov.jo/geo_env1.html.

58 Ibrahim Oroud, "Derivation of spatially distributed thermal comfort levels in Jordan as investigated from remote sensing, GIS tools, and computational methods," *Theoretical and Applied Climatology* Vol. 148 (April 2022) 569–583, https://doi.org/10.1007/s00704-022-03951-7

59 "Climate and Country Profile: Jordan," The Hague: Red Cross Red Crescent Climate Centre, June 29, 2024, 2. https://www.climate-centre.org/wp-content/uploads/RCCC-Country-profiles-Jordan-2024_final.pdf

60 Gary Rollefson, Katharina Schmidt, and Robert Schick, "One Hundred Years of Archaeological Research in Jordan," *Jordan Journal for History and Archaeology* Vol. 16 no. 3 (2022): 284. https://doi.org/10.54134/jjha.v16i3.662.

61 Roman Haddad, "The Threat of Climate Change in Jordan," Carnegie Endowment for International Peace, April 27, 2023, https://carnegieendowment.org/sada/2023/04/the-threat-of-climate-change-in-jordan?lang=en

conditions.[62] Furthermore, the country is projected to develop an even warmer and drier climate with "shifting rainy seasons and more extreme weather events like drought and frost."[63]
Flooding, for example, is considered a major concern given the country's rapid rate of development and lack of appropriate infrastructure.[64] Due to high rainfall intensity, the northern districts including the Northern Jordan Valley, are the "most susceptible areas to floods."[65] As flood flow is influenced by "topography, geology, soil cover and land-use,"[66] the geographic location and precipitation rates in the Northern Jordan Valley put it at a particular risk. In recent years, the Northern Jordan Valley's mountain roads have faced closures for up to a month at a time due to landslides triggered by winter rains,[67] yet the development and expansions of roads persist.[68]


Fig. 11. Mountain Road Connecting Al-Zamaliyyah to Irbid

According to *Jordan's Fourth National Communication on Climate Change*, the minimum air temperature throughout the country is extremely likely to increase by 2.7 °C (+2.1°C to +4.5°C) according to RCP 8.5, which is calculated as a "baseline scenario that does not include any specific climate mitigation target."[69] Based on the same scale, the maximum air temperature is extremely likely to increase by up to 3.1°C (+2.6°C to +3.7°C) by 2100.[70] The report also indicates that the Northern Jordan Valley (Aghwar Shamaliyah District) faces a "very high" sensitivity in socio-economic adaptive capacity. This shows that limited access to resources including private capital, alternative housing, and durable infrastructure impedes the capacity to "produce adaptation measures to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences."[71] This scientific understanding of the valley's climate and climate change effects, supplemented with the local narratives explored in Chapter 5, signifies the dire need for climate resilience in built environments.

62 Hasan et al., "The Effect of Temperature and Rainfall Changes"

63 Shada El-Sharif and Marwan Muasher, "Vulnerability and Governance in the Context of Climate Change in Jordan," Carnegie Endowment for International Peace, May 16, 2024, https://carnegieendowment.org/research/2024/05/jordan-climate-change-adaptation-commitments?lang=en

64 "Climate and Country Profile: Jordan," 3.

65 "Flood Hazard Map: Integrated Context Analysis Jordan," World Food Programme, July 22, 2019, 8, https://docs.wfp.org/api/documents/WFP-0000106848/download/?_ga=2.107144450.1049176265.1746784094-293962069.1745682251

66 Elias Salameh and Ghaida Abdallat, "The Impacts of Climate Change on the Availability of Surface Water Resources in Jordan," *Journal of Geoscience and Environment Protection*, 8, 52-72. https://doi.org/10.4236/gep.2020.810004

67 Ziad Al-Tahrawi, "تحويل السير على طريق سموع - دير أبي سعيد بسبب انزلاق" [Traffic diverted on the Samou'a-Deir Abi Saeed Road Due to a Landslide] Ad-Dustour, February 20, 2021, https://www.addustour.com/articles/1200504

68 "بلدية دير أبي سعيد تواصل تنفيذ عطاء فتح وتعبيد الطرق بنحو ٣٧٥ ألف دينار" [Deir Abi Saeed Municipality Implements the Tender for Paving Roads at a Cost of Around 375,000 JOD], Jordan News Agency, September, 17, 2024, https://www.petra.gov.jo/Include/InnerPage.jsp?ID=291303&lang=ar&name=news

69 Keywan Riahi et al. "RCP 8.5—A scenario of comparatively high greenhouse gas emissions," *Climatic Change* Vol. 109, no. 33 (August 13, 2011), https://doi.org/10.1007/s10584-011-0149-y

70 "Jordan's Fourth National Communication on Climate Change," The United Nations Framework Convention on Climate Change (UNFCCC), October 29, 2023, 260, https://www.undp.org/jordan/publications/jordans-fourth-national-communication-climate-change

71 "Jordan's Fourth National Communication on Climate Change," 338.



### 3.2. Culture of Change

To understand and develop a typology that is locally accepted and climate resilient, it is key to understand the cultural context of the region's vernacular architecture. The following section therefore highlights the regional development of important architectural features.

Following rhythms and patterns tied to nature, life in the Jordan Valley was built on the foundations of change. Bedouin living cultures, with their various forms of nomadism,[72] have pervaded within sedentary forms of living, granting a general sense of autonomy and climate responsiveness. Geographical factors such as land fertility and water availability[73] have encouraged both horizontal and vertical nomadism on a macro scale. This lifestyle has been translated into an architectural scale as people settled into sedentary lifestyles. In documenting the formation of a traditional Arab architecture, Ragette notes that horizontal and vertical nomadism have remained important traditions in withstanding Arab climates. In cold winters, south-facing rooms with large windows usually sit on one side of the courtyard, inviting the sun inside. To escape the intense sun and heat of the summer, dwellers migrate to the other side of the courtyard with north facing windows and high thermal massing.[74] Furthermore, dwellings such as the single cell units of Al-Zamaliyyah maintained simplicity in interior forms, allowing for a high degree of flexibility.


Fig. 12. Extended Columns for Vertical Growth in Al-Zamaliyyah

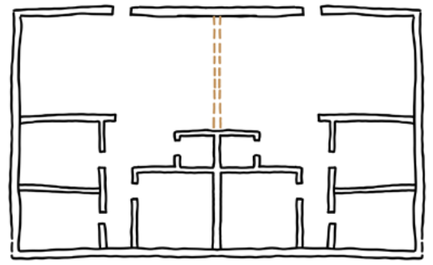


Fig. 13. Horizontal Nomadism: Multi-family Apartment Floor Plan of the Author's Family's Home in Amman. Orange dashed line represents habitually demolished and reconstructed partition wall.

Despite giving way to some adapted traditions, Ragette notes that in the initial stages of settling, Bedouins were known to continue living in tents surrounded by walls.[75] Elements of freedom and adaptivity such as the tent, courtyard, and terrace were gradually forfeited as governmental bodies encouraged higher and higher degrees of 'settling'. Nonetheless, the cultural commitment to change and adaptability of space prevails. It can be observed through the construction of concrete columns one floor taller than required, giving room for vertical growth (Fig 12). Horizontal nomadism can be exemplified in the vernacular renovation of a multi-family apartment in Amman. During the summers, when an additional family unit moves into the apartment for a few months, a temporary interior wall is added to divide one apartment into two (Fig. 13).

72 See: *The Evolution of Semi-nomadism in Non-desert Environment: The Case of Galilee in the 19th Century* (1990).

73 Elizabeth Bacon, "Types of Pastoral Nomadism in Central and Southwest Asia," Southwestern Journal of Anthropology, Vol. 10, No. 1, Spring, 1954, 56 https://www.jstor.org/stable/3629075

74 Friedrich Ragette, *Traditional Domestic Architecture of the Arab Region*, (Sharjah, UAE: American University of Sharjah, 2012).

75 ibid, 49

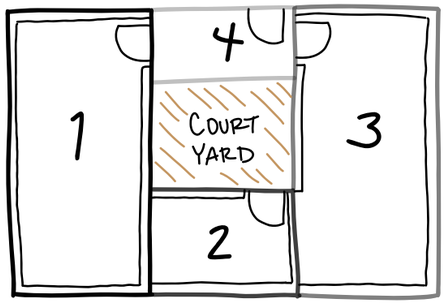



Fig. 14. Closed Courtyard, Numbers (1, 2, 3, 4) Represent a Possible Sequencing in the Construction of Rooms Over Time

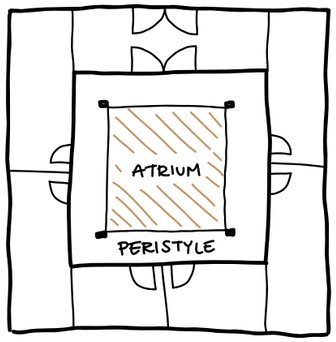



Fig. 15. Classical Atrium Surrounded by a Continuous Covered Peristyle

Traditional and vernacular forms, especially those of mud, utilize relationships between the solid and the void to establish livable climates and encourage a positive relationship between the interior and the exterior.[76] The solid, or the interior is usually protected by a buffer zone which also serves to improve natural ventilation. Some examples include the courtyard and the entrance hall. In rural and vernacular cases, the courtyard is often established through incremental growth. Ragette carefully distinguishes this form of a "closed courtyard" (Fig. 14) from a "classical atrium", (Fig. 15) which evolved from a "hall, illuminated through an opening in the middle of the roof[…]but was always surrounded by a continuous covered passage, usually a peristyle."[77] In the closed courtyard, rooms are often built one at a time, leading at first to an L-shaped courtyard, then U-shaped, and eventually the common fully enclosed form.[78]

Substantiated by Islamic and pre-existing Arab cultures, forms in traditional houses like courtyards developed not only as respite from the harsh environment, but to uphold social and privacy standards as well. Traditional dwellings designated varying levels of privacy for the family unit, women, and individuals. For example, the entrance hall provides a transitional space between the interior and exterior, protecting the privacy of the house.[79] The classical atrium courtyard and its surrounding arcades provide women with a private outdoor space. Interior rooms provide the individual with the highest level of privacy. Curated privacy in Islamic culture is not meant to encourage isolation, but rather a sense of safety and autonomy in access to public spaces. The traditional act of manipulating spaces and their uses continues to date. Its causes and effects will be explored throughout the following chapters through the regional progression from nomadism, semi-nomadism, to sedentary living in the region surrounding Al-Zamaliyyah.

76 Malhas, interview: Malhas was a student of Ragette and helped in research and documentation for *Architectecture in Lebanon* (1980).

77 Ragette, *Architectecture in Lebanon*, 88

78 Malhas, interview

79 Hisham Mortada, *Traditional Islamic principles of Built Environment*, (London; New York: Routledge Curzon, 2003), 118.



### 3.3. Mud and Spirituality

Within the culture of change, mud architecture was traditionally honored for its ephemeral nature. In the context of ancient Egypt, researcher Luiza Silva highlights the dual role of mud bricks in both mundane and divine constructions. Her work demonstrates the symbolic and cosmological value of the mud bricks through its use in foundation ceremonies, birthing and funerary rituals, and "visual depictions of the king molding bricks", to suggest the ancient Egyptian association of mud with "creation and life cycles."[80]
Such values are reflected in Islamic understandings of mud as a construction material promoting ephemerality as a spiritual concept. In Islamic cities, urban and architectural forms were constructed in a state of "full awareness of its passing", a reminder of the "ephemeral quality of life on earth."[81] Malhas draws a parallel between the garden and the mud house, both needing patience and seasonal maintenance.[82] Through his projects and teachings, architect Abdel-Wahed El-Wakil manifests the design philosophy of ephemerality in architecture. While houses adopt the material form of our own mortal bodies, permanence is reserved for monuments and sacred buildings which embody an eternal spirit.[83] This sentiment is echoed by architect Ammar Khammash in his documentation of earthen architecture in the Jordan Valley. He muses that "[mud] is the choice of God for creating us, and the choice of early humans to create their architecture."[84]

Fig. 16. Waqqas Mud House Courtyard

Traditional mud architecture, as shaped by symbolic and spiritual intentions, respects the bounds and gratuities of nature, projecting a cohesive image of harmony with its surrounding environment. Although Ragette defines mud as a "weak and dusty material",[85] he values the atmospheric harmony of traditional Arab architecture. He sees beauty in the visual continuity between floor and ceiling and the implicit dynamism and ambiguity of space through contrast between levels and openness. The flexibility of interiors and exteriors paired with the careful treatment of light and reflections remind one of the "ephemeral quality of our existence." Furthermore, Ragette commends the phenomenological harmony of the traditional setting, noting its simultaneous achievement of environmental unity and ephemerality, symbolizing the "all-pervasive presence of Allah."[86]

In mud architecture, a sense of community is highlighted not only in traditional forms encouraging appropriate interactions, but during the construction and maintenance of both private and public

80 Luiza Silva, "The Myth of the Mundane: The Symbolism of Mud Brick and Its Architectural Implications," *Journal of the American Research Center in Egypt* Vol. 56 (2020), 184 http://dx.doi.org/10.5913/jarce.56.2020.a012

81 Seyyed Nasr, "The Contemporary Muslim and the Architectural Transformation of the Islamic Urban Environment". In *Toward an Architecture in the Spirit of Islam*. Renata Holod, ed. Philadelphia: Aga Khan Award for Architecture, 1978, 3.

82 Malhas, interview

83 Caravane Earth, "Documentary: Architect Abdelwahed El-Wakil وثائقي: المعماري عبدالواحد الوكيل," YouTube, Nov 25, 2022, video, 30:14, https://youtu.be/arTivLicuEs?feature=shared.

84 Khammash, "Life in Mud".

85 Ragette, *Traditional Domestic Architecture*, 26.

86 ibid, 91

structures as well. As with most forms of vernacular architecture, mud construction holds a high social value as the labor intensive process requires communal efforts. Maintenance traditions further the social aspect of mud architecture as its routine and less labor intensive nature promotes the inclusivity of women and children in the process. These traditions are an architectural manifestation of the regional concept of *ouneh*, a form of "informal, collective philanthropy led by community members to help individuals or the well-being of the entire community."[87] In the case of rural mud houses, their construction and maintenance requires the support of a whole community. The migration of community members into concrete houses has limited this concept into extinction in villages like Al-Zamaliyyah.

The changing climate outlined in this chapter necessitates the revaluation of tradition-based environmental and cultural wisdom. Vernacular strategies provide climate resilient solutions utilizing local materials and climate specific knowledge accumulated over time. Honoring these solutions is particularly vital for rural communities such as Al-Zamaliyyah as they face both the impacts of climate change and negative social stigmas surrounding mud and poverty.

87 Sarah Bahn and Hania Aswad, "Youth Revitalize Forgotten Philanthropic Practice in Palestine" Candid Learning for Funders, October 26, 2016, https://learningforfunders.candid.org/content/blog/youth-revitalize-forgotten-philanthropic-practice-in-palestine/



CHAPTER 4

# Towards Materialism

*They wanted Switzerland in the Jordan Valley...*[88]

(Malhas, 2025)

The following chapter discusses the introduction of Western ideologies in Jordan, and how colonial and global forces encouraged a divorce from local forms of architecture. This discussion explores the regional shift from mud to concrete typologies to establish a deeper understanding of the current situation in Al-Zamaliyyah. It then addresses Fathy's understanding of tradition and contemporaneity to highlight the need for balancing tradition and modernity in rural development.

## 4.1. Rurality and Rural Reform

Around ten years after the establishment of the Emirate of Transjordan in 1921 under the British mandate, British forces implemented a Land Reform in the country to facilitate taxation and promote capital productivity. As early as 1933, land management transitioned, mainly in agricultural contexts, from previous Ottoman and Islamic principles such as *matruk* (common land), *musha* (collectively owned and maintained agricultural land), and *waqf* (Islamic endowment) which served community-based values. The eradication of *musha* land, for example, is cited as "one of the major goals of land settlement". Detested by the colonial mindset, the collective ownership and maintenance of agricultural land was perceived as an "obstacle to development."[89] The British solution was to divide and "settle" these lands, transferring ownership from the collective to the individual for increased agricultural productivity and land taxation.[90]

This period marks the introduction of capitalism and individualist values in Jordan, and the relinquishment of power from the people to the government. Even in the words of British official John Bagot Glubb, "the establishment of law and order [in Jordan] resulted in the rich becoming richer and the poor growing poorer" as the "country's peasant majority...paid the most in taxes."[91] This resulted in a growing divide between economic classes in Jordan, and later translated to mass growth among the wealthy, and government reliance among the working class.

88 Malhas, interview

89 Michael Fischbach, *State, Society, and Land in Jordan* (Leiden; Boston: Brill, 2000), 104.

90 Fischbach, *State, Society, and Land in Jordan*

91 ibid, 164-178

This new relationship between the people and the government sets the foundation of newer villages like the Jordan Valley's Al-Zamaliyyah and Luxor, Egypt's New Gourna. The government involvement in establishing these villages to increase agricultural productivity enforces capitalist standards, introducing Western values and limiting the autonomy of the people.

### 4.2. Globalization and Modernity

Fig. 17. Mud Houses in Al-Zamaliyyah, Jordan

Fig. 18. Detached Housing Type in Irbid, Jordan

Local values were again transformed as globalization encouraged the rise of the regional Modernist movement of the 1970s, causing a break in the continuity of architectural tradition. In Jordan, this discontinuity is displayed in its concrete. Localized materials including mud and stone were abandoned in favor of concrete and other modern industry materials and construction techniques. Traditional and vernacular forms became "archaic and obsolete", in comparison to the new materials.[92] Eventually, imported materials and systems including air-conditioning fully replaced traditional crafts and wisdom as the mainstream form of construction.[93]

In the initial phases of departing from traditional materials, vernacular houses made with concrete typically maintained the key spatial elements of traditional houses. Openings remained strategically placed and minimal, and transitional spaces such as the entrance hall and arcades were maintained. Courtyards and similar open spaces were appreciated, especially among Muslim women, for the private connection they provided with nature. Initially, the vernacular dwelling remained the "unconscious expression of a people's culture" as houses continued to act as the embodiment of interactions between human and environment.[94] In the urban center of Irbid, a city around 35 kilometers east of Al-Zamaliyyah, there is a noticeable distinction between the old city center of the 1950s[95] and the new center of the 1970s.[96] Research published in the *International Journal of Urban Sustainable Development* has found that, from an architectural perspective, two main typologies influence the social sustainability of neighborhoods in the two city centers. The "detached housing type", more common in the old city center, usually includes a smaller building of two to three stories, increased setbacks, and an outdoor yard providing a culturally-appropriate space for gathering among family members and neighbors. In contrast to the more contemporary apartment buildings typically found in the new center, the detached houses align with the human scale and promote "social interaction, stability, [and a] sense of belonging",[97] lending to a greater sense of social sustainability.[98] The contemporary apartment buildings of four to five floors, large windows, and small balconies dominate the new city plans.

Fig. 19. Apartment buildings in Amman, Jordan

The detached housing type is still found in rural areas such as Al-Zamaliyyah as families often lack the resources to build and maintain the multistory concrete houses which now dominate urban landscapes throughout Jordan. The utilization of traditional forms and materials in such cases gives it its association with poverty. One neighborhood in Ma'an, a municipality in southern Jordan once rich in mud architecture, welcomed the destruction of its mud houses in efforts towards "preserving public safety." The demolished houses were around one hundred years old, but due to their lack of maintenance, had been requested for demolition by their owners.[99] This case, emblematic of the larger attitude towards traditional mud houses, displays the regional shift in values from those which embody society's spiritual and scientific knowledge, to those which aspire towards Western notions of progress. It further signifies the need for a nuanced approach to revitalizing the threatened heritage values of the Jordanian mud house typology.

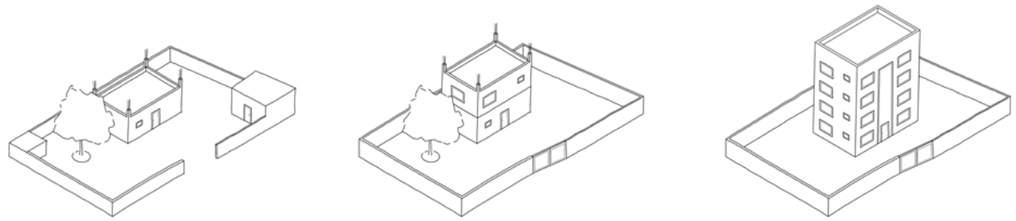


Fig. 20. Diagram Showing Typical Growth from Detached Housing to Apartment

92 Omar Khattab, "Globalization versus localization: Contemporary architecture and the Arab city," *Council on Tall Buildings and Urban Habitat Review* Vol. 1 no.3 (2001), 57.

93 Yasser Mahgoub, "Globalization and the built environment in Kuwait," *Habitat International*, Volume 28, Issue 4, (June 22, 2004), 505-519, https://doi.org/10.1016/J.HABITATINT.2003.10.005

94 Ragette, *Architectecture in Lebanon*, 184

95 Hikmat Ali, Yamen Al-Betawi, and Hadeel Al-Qudah, "Effects of urban form on social sustainability – A case study of Irbid, Jordan," International Journal of Urban Sustainable Development Vol. 11 no. 2 (March 26, 2019). 209, https://doi.org/10.1080/19463138.2019.1590367

96 Fuad Malkawi and Isra al-Qudah, "The house as an expression of social worlds: Irbid's elite and their architecture," *Journal of Housing and the Built Environment* Vol. 18, (March 2003), 25–48, https://doi.org/10.1023/A:1022445803525

97 Ali, "Effects of urban form on social sustainability," 220

98 ibid

99 Suleiman Al-Hasanat, "بلدية معان تنفذ حملة لإزالة المباني الآيلة للسقوط وسط ترحيب المواطنين - فيديو," Roya News, June 18, 2023, https://beta.royanews.tv/news/254651

Fig. 21. Jordan Eco Park Cabin in an Imported Western Style

Yet as concrete and other imported systems have since become the new standard in both the urban and rural contexts, the knowledge behind traditional construction and logic are viewed as all but obsolete. Windows do not need to be strategically placed or minimal in size when air conditioners are readily available. This results in buildings with large windows and inappropriately low surface area to volume ratios and high energy costs.[100] Outdoor spaces are minimized in favor of larger, taller buildings. Walls which once defined private yards now serve merely as barriers between the building and the street, confining the inhabitants rather than freeing them.

Such transformations away from tradition and towards internationalized ways of building are apparent in the reduced social sustainability of neighborhoods and the lack of context in new typologies. Non-local systems such as pitched roofs with red roofing tiles and glass facades have become popular, not for their climatic or social functions, but despite them. In Jordan's dry climate, very few regions necessitate pitched roofs, yet they can now be found throughout the country, functioning as outward displays of the social status and wealth of the owner.[101] Malhas' remark on the phenomenon, "they wanted Switzerland in the Jordan Valley…",[102] refers to the new valuation of foreign materials and typologies in the valley, reducing the house from a reflection of the natural and spiritual environment to a status symbol. Employed in a similar fashion, large windows and glass facades are increasingly common, especially in urban centers. The glass box addition on top of the German Jordanian University in Jabal Amman, for example, negates the context-appropriate logic of the existing building. The original windows of the existing building were relatively small, protecting the privacy and thermal comfort of the interior. The addition forms a glass box in Amman's city center, leaving the interior subject to the intense light and heat of the summer sun, exaggerated cold of the winter, and loud noises of the surrounding streets.

### 4.3. Moving On to a True Contemporary

The colonial rule and international influences of the 1930s to present have created a seemingly unshakable dependence on industry based materials and systems. Building construction, operation, and maintenance is increasingly dominated by external sources, limiting the autonomy and financial accessibility of such typologies, mostly in rural areas. Having observed the state-backed encouragement of materialistic values, Fathy developed philosophies on tradition and contemporaneity, aiming to limit its negative impacts and empower the people through architecture.

Fathy defines tradition simply as a reaction to a problem, repeated by many, a "social analogy of personal habit."[103] Therefore, the same simplicity that tradition may be established with invites its very erasure. In regards to architectural traditions, as climates and technologies change and evolve, new needs are created and met. Such rapid developments, even within a culture built on change, requires traditions to also evolve or phase out of necessity. As traditions fail to do so, the previously discussed discontinuity in architectural typologies and systems emerge.

Contemporaneity, according to Fathy, is a concept in planning "intimately linked with the notion of change", one that is in full accord with "humanity's total knowledge of science" to relate to the present.[104] While the present moment is "an instant, always changing, and always with us", Fathy argues that in any given moment, there are several options which might represent a true contemporary.[105] In relation to mud and a true contemporary, the lack of its social acceptance must be acknowledged as a facet of the material to be overcome in its contemporary applications. Avoiding this has led to the previously discussed hierarchical applications of mud in contemporary use. In concrete architecture, the traditional wisdom of mud is often absent, leaving modern constructions with reduced social and environmental sustainability. Fathy's discussion of contemporaneity was centered around the architecture of the city, and his rural projects were, in efforts to maintain the autonomy of the villagers, limited to tradition. Meanwhile, local perceptions of modernization continue towards larger concrete dwellings rooted in a lifestyle imported from the West. This one dimensional perception of modernity has extended the decay of local traditions, necessitating a true contemporary of even the rural form which accounts for the change and progress that residents strive for through their dwellings. Otherwise, growth will almost certainly repeat the mistakes of the modern Arab city in disregarding local wisdoms, resulting in the alienation of the building in its natural surroundings.[106]

Change has always been a staple of Arab culture, allowing for growth based on accumulated knowledge. Yet the change brought about by the international influences of the British mandate and globalization has caused a lapse in the integration of existing knowledge in new developments. This discontinuity has allowed for the framing of mud as a symbol of poverty and a past to outgrow. The negative social perception of mud, paired with the fickle nature of tradition as outlined by Fathy, puts it at risk of erasure, necessitating the development of a "true contemporary" which highlights the tradition-based wisdom of mud architecture, and the modern developments of contemporary architecture. However, the lack of existing dialogue between traditional and modern typologies limits the development of a true contemporary, especially in rural housing. While Al-Zamaliyyah has yet to fully abandon architectural tradition, the next chapter explores the few traces of traditional knowledge in modern typologies, and the lack of modern developments in traditional houses through the case of Al-Zamaliyyah.

100 Samer Abu-Ghazalah et al., "Building's Envelope: Surface-to-volume ratio as an energy saving tool in Jordanian homes," *Nuova Energia* Vol. 12 (2007).

101 Daher, "Domesticated Modernity."

102 Malhas, interview

103 Fathy, *Architecture for the Poor,* 24.

104 Fathy, "Contemporaneity in the City," 57.

105 ibid

106 Hassan Fathy, "Constancy, Transposition, and Change In City Design For the Arab City In the Future," Hassan Fathy Archives, Aga Khan Trust for Culture (Geneva, Switzerland) https://www.archnet.org/publications/6446

CHAPTER 5

# Al-Zamaliyyah
## Village Analysis

*He is penniless, you know that. His one and only ambition was to move from the mud house which he has occupied in the camp for ten years and live under a concrete roof, as he used to say.*[107]

(Kanafani, 1962)

### 5.1. Background

Much of the information forming this chapter is drawn from the EADI site visit to Al-Zamaliyyah on June 7, 2024, of which I was honored to take part in. To provide a nuanced understanding of the architecture of Al-Zamaliyyah, this chapter begins with a brief description of the village's background and relevant architectural typologies. To understand the socio-cultural situation of the village, specifically in regards to its mud houses, local narratives are utilized. The following architectural analysis of the village's mud and concrete houses helps to draw conclusions for the index, where the strengths and weaknesses of both typologies are weighed. In the index, key contemporary architectural needs are outlined and related to both typologies. This analysis allows for an informed design approach adapting to the evolving needs of the people. Furthermore, a detailed understanding of the local practices and lifestyles is necessary for the goal of aemulatio. To be able to copy and improve, one must first understand what they are copying and why.

Al-Zamaliyyah was first settled in the 1920s in an agreement with the government exchanging land ownership for a margin of the produced harvest. Farmers from a nearby village, Azmal, cultivated the land, but chose to maintain their residence in their village, trekking twenty kilometers daily between the farms of Al-Zamaliyyah and their homes in Azmal. When necessary during the harvesting period, the farmers would reside in nearby caves, seeking protection from Bedouins, rodents, and malaria.[108] To improve the productivity of the agricultural sector, the government campaigned for the sedentarization of Bedouin tribes in the early 1930s.[109] In Al-Zamaliyyah, this facilitated agreements between the farmers of Al-Zamaliyyah and the surrounding Bedouins, allowing for the formal establishment of Al-Zamaliyyah with a cluster of mud houses near the farms.[110]

107 Ghassan Kanafani, *Men in the Sun and Other Palestinian Stories*, translated by Hilary Kilpatrick, Lynne Rienner Publishers (1999), 26

108 Jamal Khreisat, "الواقع الاقتصادي في منطقة غور الأردن الشمالي: قرية الزمالية" [The economic reality in the northern Jordan Valley: Al-Zamaliyah village], Masters thesis, (Yarmouk University, 1996).

109 Vartan Amadouny, "The British Role in the Development of an Infrastructure in Transjordan During the Mandate Period, 1921-1946," PhD diss., (University of Southampton, February, 1993), 200 https://eprints.soton.ac.uk/462123/1/381419.pdf

110 Khreisat, "الزمالية"

The history associated with the village and its establishment echoes throughout its architectural development as it ranges from temporary Bedouin tents and caves, to traditional mud, to concrete structures. In the transformations between housing typologies, one can observe the remnants of Bedouin and farmers' traditions as the villagers fight to exist within a capitalist system without compromising contemporary needs such as safety from increased climate events and social pressures for conformity. Within the village, three main housing typologies exist; the mud house, the simple concrete block house, and the reinforced concrete house. As a largely vernacular village, each typology exists on a spectrum depending on the availability of resources.

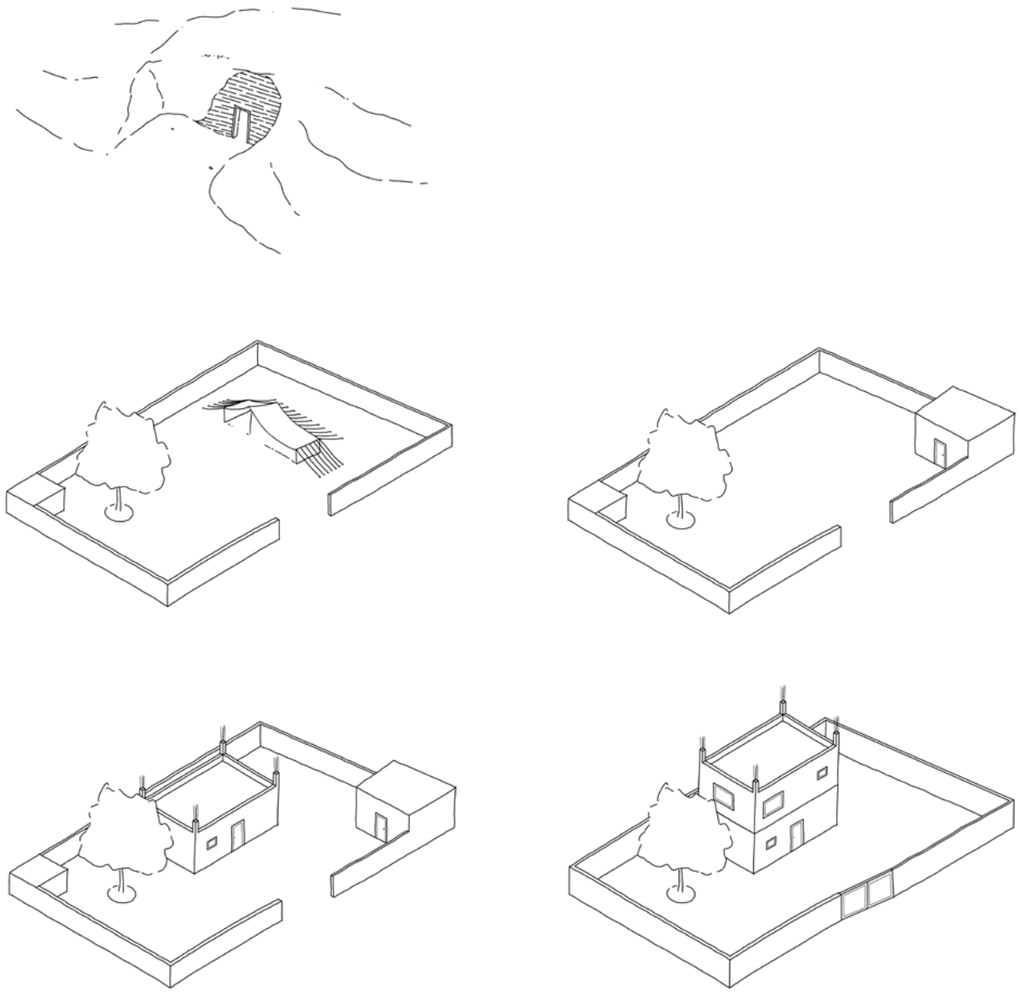
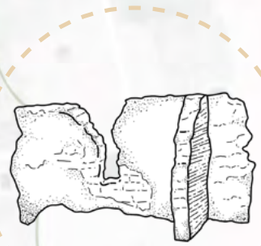


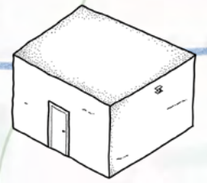
Fig. 22. Overview of dwelling types ranging from caves and Bedouin tent, mud house, simple concrete house, and the reinforced concrete house

N

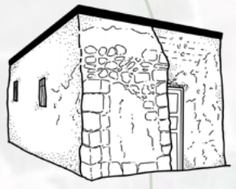
## Al-Zamaliyyah Master Plan



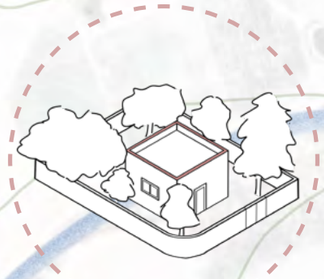
Mud Ruins

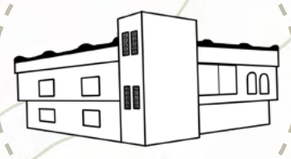


Mud House



Vernacular Interventions





LEGEND

- Concrete Houses
- Schools
- Mosque
- Mud Houses
- Housing Project
- Factory

Fig. 23. Al-Zamaliyyah Master Plan

### 5.2. Local Narratives

In Arab culture, where change is constant, knowledge is traditionally relayed orally. In cases like Al-Zamaliyyah, where mud houses were formed based on *ouneh*, wisdom was accumulated and transferred through experience and oral narrations. Honoring this tradition, this section highlights local narratives to define the village's socio-cultural and personal relationships with houses and community spaces. From this, conclusions can be drawn pertaining to the social perceptions of mud houses, their most common physical weaknesses, and the solutions sought after by the residents.

#### 5.2.1. Interview: Ahmad Qasim

The following information was extracted from an interview conducted by Mariam Al-Azzeh with Al-Zamaliyyah resident, Ahmad Qasim during an EADI site visit on June 7th, 2024. Having had experience with mud houses, he was recommended for an interview by other residents. Emulating the spirit of *ouneh*, Qasim shared a verbal explanation of the mud house's material composition and form. The following information including the construction, maintenance, and drawbacks of Al-Zamaliyyah's mud houses are the result of this interview, which was translated from Arabic by researcher Mariam Al-Azzeh and paraphrased by the author.

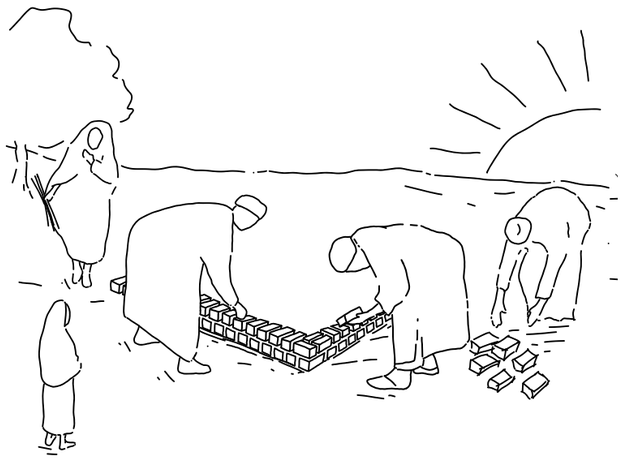


Fig. 24. Mud House Construction

Based on *ouneh*, the construction of mud houses was a social and communal activity. All the neighbours gathered to assist with building the bricks and houses. This way, everything was done correctly and efficiently. It was during this time, learning by doing, that the young men would be handed down the information, the practical knowledge of how and why to build in mud. The actual construction process would take approximately two days, with work beginning at dawn to minimize exposure to the midday heat.



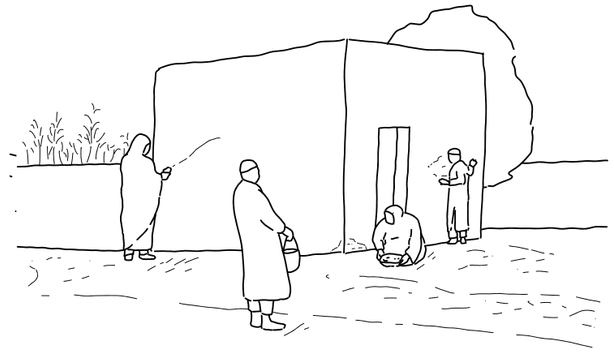


Fig. 25. Mud House Maintenance

While the main construction works were carried out by males, females participated in annual maintenance practices, usually taking place in September. Typically, maintenance work included the reapplication of the lime plaster if deemed necessary, and applying new layers of mud to the roof to prevent leakage during the coming winter.

When the mud houses were first built in the late 1960s, they were valued as a safer, more secure development of the previous Bedouin tents. By the time concrete had made its way to Jordan and to the village, the mud houses lost their status value.

In the early 1990s, Al-Zamaliyyah was hit by a flash flood causing occupants to flee to the village's school, a concrete building, for three days. The mud houses were, and still are viewed with disrespect, associated with poverty and continual labor.

In 2021, eviction orders were issued to the majority of people residing in mud houses due to their unsafe living conditions. Although most were not financially able to relocate immediately, by 2024 only two complexes remain in use while the others are left to face their swift return to earth.[111]

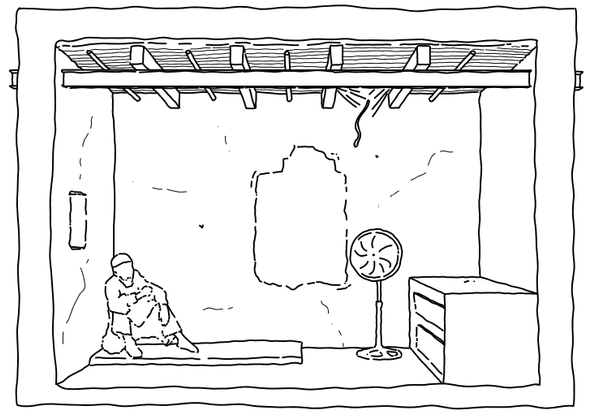


Fig. 26. Mud House's Social Stigma

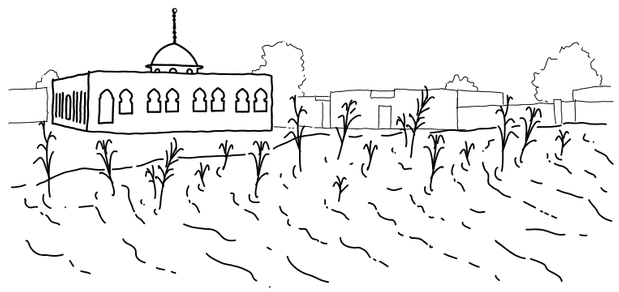


Fig. 27. Al-Zamaliyyah Flood

111 Ahmed Qasim, Interview by EADI, led by Mariam Al-Azzeh, June 7, 2024.

### 5.2.2. News Reports

The following section contains first-hand accounts of Al-Zamaliyyah's residents via news reports published as public YouTube videos. Four videos were selected and analyzed in relation to life in Al-Zamaliyyah, specifically those living in mud houses and unsatisfactory concrete houses to provide a contemporary understanding of the village, the problems the people face, and the solutions they seek.

Video 1:

**"Mukhtar of the Town of Al-Zamaliyyah, Youssef Al-Darawsheh"**

(«مختار بلدة الزماليه يوسف الدراوشه»)

This account including the video title is translated from Arabic and paraphrased from a video published online March 3rd, 2023. Told by the village chief, the video showcases the tradition of oral storytelling while his story highlights the heritage, religious, and community aspects of Al-Zamaliyyah.

Fig. 28. Youssef and The Old Mosque of Al-Zamaliyyah

This village is called Al-Zamaliyyah after the people of Azmal. They founded the village in the 1920s when the government gave them these lands in the Ghor [Jordan Valley], and they came from Irbid to cultivate the land.
Eventually, the village grew, day by day the people increased and eventually they thought of building a mosque. Luckily, people came from Lebanon who had great skill in stone construction, so the people of the town, including my grandfather asked them, "What do you think about building a mosque for us? We will pay you and host you in our homes." So the young men started working. They brought stones from around the village, cut them, and built the mosque. This was in 1942. People have been praying in that mosque ever since.
In 1948, during the Nakba, our brothers came from Palestine as refugees and settled here with us, so the population of the village increased, and the mosque became even more important. Then the Ministry of Awqaf [Charitable Religious Endowments] and Islamic Affairs officially appointed an imam. The Ministry is still preserving this mosque and appointing an official imam in it who helps maintain it.



When the population of the village increased again around 2007-2008, the people of the village decided to form a committee with the Ministry to build a new, bigger mosque in Al-Zamaliyyah. Nonetheless, the Ministry did not want to demolish the old mosque because of its history. It is considered a historical monument and part of the village's heritage, so it had to remain.
The mosque is still being used, and the people maintain it and pray in it, but the mosque needs proper restoration. It has been a long time since it was built, and it needs restoration and structural work to preserve it and keep it standing. The people have not neglected it, and God willing, this message will reach the Minister of Awqaf so he can give the mosque the attention it deserves.
The people care deeply about it. This mosque was established with the people of the village, with their ancestors. They take pride in it. All of us have prayed here, as have our fathers and grandfathers, and now our children pray in this mosque. So we want this mosque to remain part of our heritage, to be more well-known, better maintained.[112]

Video 2:

**"Northern Jordan Valley: A Family in the Al-Zamaliyyah Area Lives in a Room of Mud, February 19, 2017"**

(«الأغوار الشمالية :عائلة في منطقة الزمالية تعيش في غرفة من الطين 19-2-2017»)

The video title and following accounts are translated from Arabic and paraphrased from Yarmouk News' report published online February 19th, 2017 concerning the reality of those living in Al-Zamaliyyah's mud houses. The interviews are supplemented with the following information:
A family of seven lives in Al-Zamaliyyah in the Northern Jordan Valley in a single room built of mud bricks. This situation reflects the situation of many citizens who live in the same difficult conditions.

Fatima Mustafa: My four sons, daughter, my husband, and I live in a room, in one room, not by choice. The ceiling is made of sticks and does not protect us from the rain, by God, and we are appealing to the good people, help us. We are appealing to His Majesty King Abdullah, help us.



Fig. 29. Broken Mud House Ceiling

Omar Beni Ali: By God, I would like to send a message to his majesty, the king. I would like to tell him, look at our situation. In winter, no offense to the house, we get rain and in the summer we get scorpions and mosquitoes, and snakes. We are three brothers, and we work during the onion season and the olive season, but the salary is not enough for electricity, water, food, and money for our family. I want to send a request to his majesty, the king, that I get a job that enables me to help my mother and father in the last years of their lives.[113]

112 المبادرات الإنسانية في ضوء الراية الهاشمية [Humanitarian Initiatives from the Hashemite Banner], "مختار بلدة الزماليه يوسف الدراوشه [Mukhtar of Al-Zamaliyyah, Youssef Al-Darawsheh]," YouTube, March 3, 2023, video, 3:28, https://youtu.be/AluzkQTWLDk?si=k93JspOYkSUKWhVt.

113 اليرموك الإخبارية [Yarmouk News], "الأغوار الشمالية :عائلة في منطقة الزمالية تعيش في غرفة من الطين 19-2-2017 [Northern Jordan Valley: A Family Al-Zamaliyyah Lives in a Room of Mud, February 19, 2017]," YouTube, February 19, 2017, video, 2:54, https://youtu.be/-p9a7Nnvnec?si=6LM6-ibObgY2jSmK.

Video 3:

**"The People of Al-Zamaliyyah Village in the Northern Jordan Valley - No Place to Live Except their Dilapidated Mud Houses"**

(«أهالي قرية الزمالية في الأغوار الشمالية.. لا مكان يؤيهم إلا بيوتهم الطينية الآيلة للسقوط»)

The next three accounts are translated from Arabic and paraphrased from AlMamlaka TV's new report published online July 8th, 2021 following the issuance of eviction orders to several residents of Al-Zamaliyyah's mud houses. The interviews are supplemented with the following information: Dozens of families in the Northern Jordan Valley live without the minimum necessities of life. Families live in dilapidated houses and despite eviction orders, there is no alternative for them. Their only hope today is to move from the Jordan Valley to find work that would provide them with the minimum necessities of life.

Yusra Al Obaid: We have been living in the house for six years. The ceiling and the roof fell on us and the National Aid brought us only a tent and space heaters. The electricity has been cut off for four years. The ceiling has fallen in and snakes and scorpions have fallen from it. I stay up all night watching my sons until morning so that they're safe from the scorpions. They tell me to go, I'm forced to, but where can I go?

Fig. 30. Yusra's House Three Years Later (2024)

Saleh Attian: By God, life is difficult. We prefer death over the lives we're living here. We sit here in our houses of mud and fear the collapse of the roof. Most of the houses here have an evacuation order, and everyone who can will evacuate because the houses are falling.

Hamda Twisat: We don't know how to live in this house, we don't know how to sleep in it at all. In the winter, as God gives us rain, the houses rains upon us. The water pours in from all sides. We receive 66 Jordanian dinars [78 euros][114] from the National Aid to cover rent, electricity, water, and food. We have nowhere else to go.[115]

114 As of July 8, 2021 according to the European Commission, "Exchange Rate (InforEuro)," https://commission.europa.eu/funding-tenders/procedures-guidelines-tenders/information-contractors-and-beneficiaries/exchange-rate-inforeuro_en

115 AlMamlaka TV, "أهالي قرية الزمالية في الأغوار الشمالية.. لا مكان يؤيهم إلا بيوتهم الطينية الآيلة للسقوط [The People of Al-Zamaliyyah Village in the Northern Jordan Valley - No Place to Live Except their Dilapidated Mud Houses]," YouTube, July 8, 2021, video, 3:11, https://youtu.be/-p9a7Nnvnec?si=6LM6-ibObgY2jSmK.



Video 4:

**"112 Northern Jordan Valley Residents of Housing Project in Al-Zamaliyyah Suffer from Deteriorating Infrastructure"**

(«الأغوار الشمالية أهالي إسكان المكرمة في الزمالية يعانون تردي البنية التحتية الحقيقة الدول 112»)

As part of an investigation conducted by Al-Haqiqa Al-Dawlia (Fact International) to unveil the reality of services provided to citizens in the Northern Jordan Valley region, the organization visited the Al-Zamaliyyah Housing Project, which was built through a royal grant for families in need. These families are now suffering from several crises due to the absence of basic services, which were to be ensured by the King. The infrastructure, roads, and basic services are lacking in this region, and the residents of the project now face the additional burden of high water bills. A video discussing the situation with residents was posted on November 9th, 2021. Comments from residents are summarized as such:

God has given us relief through this [concrete] house, but now we face problems with water and electricity. When they handed us the house in 2006, they said that the cost would be at the expense of the Royal Court, but now they have surprised us with the bills of the past four years. Here we don't have anything, we are in God's hands. We're not able to pay these bills, whether we owe five hundred, one thousand, or two thousand, we're not able to pay. It's all in God's hands.
The house needs maintenance. The doors are broken. The windows are broken. It needs complete maintenance. We have no idea where we are anymore. It's true that we're here in the projects of Al-Zamaliyyah but it doesn't feel like that's the case anymore. We do not want to be renting or selling, we want to rest. If we rent and sell, like all the other workers, our souls will fall victim to the system.

Fig. 31. Al-Zamaliyyah Main Village (left) and Al-Zamaliyyah Housing Project (right)

Like the rest of Al-Zamaliyyah, the project's streets and electricity suffers from a lack of services. The lighting units require maintenance work. The internal roads require maintenance to mitiage the danger of the winter rains through irrigation channels. The projects are situated on a hill and the lower areas usually witness landslides and floods in the winter, which threaten the entire infrastructure.[116]

116 الحقيقة الدولية [Fact International],"الأغوار الشمالية أهالي إسكان المكرمة في الزمالية يعانون تردي البنية التحتية الحقيقة الدول 112 [112 Northern Jordan Valley Residents of Housing Project in Al-Zamaliyyah Suffer from Deteriorating Infrastructure]," YouTube, November 9, 2021, video, 6:37, https://youtu.be/TfBbehmzR7U?si=qaaM3FubzxQICAxn

Residents of mud and concrete houses alike have voiced their dissatisfaction with their housing arrangements. Mud house residents are unable to maintain their houses, leaving them susceptible to the cold winter rains. Residents in the village's concrete housing project are unable to afford the costs associated with modern living.

These problems, although varied in nature, can largely be attributed to the reduced sense of community-based autonomy as the practices surrounding *ouneh* have become lost. For those living in mud houses, the majority of the village building in concrete has significantly reduced the practices surrounding *ouneh*. With fewer people living in mud houses, the community involved in their upkeep is reduced to an individual responsibility. Additionally, the lack of *ouneh* has hindered the transmission of knowledge, meaning that residents are no longer equipped to maintain their own houses. This despair has reverted the residents to reliance on the government to improve their housing conditions. In the concrete houses of the housing project, a similar government reliance is formed because the knowledge of their construction and upkeep was not generated from within the people but rather from an external source. Furthermore, in rural cases like Al-Zamaliyyah where climate challenges endanger livelihoods,[117] reliance on industry materials and labor reduces the vernacular capacity in constructing and maintaining homes.

### 5.3. Architectural Analysis

Linking local narratives to morphological changes, this section explores the traditional mud and modern concrete typologies in rural housing. The findings and insights in this section were made by the author during the EADI site visit to Al-Zamaliyyah in June of 2024. Understanding the background and historic value of each typology will help to interpret the needs and general despair associated with mud houses, and the limitations of the contemporary concrete houses in Al-Zamaliyyah. In the next section, this will help to define the advantages and disadvantages of each housing typology. These findings contribute to the overall search for a new rural housing typology which balances social and environmental needs and values.

#### 5.3.1. Mud Houses

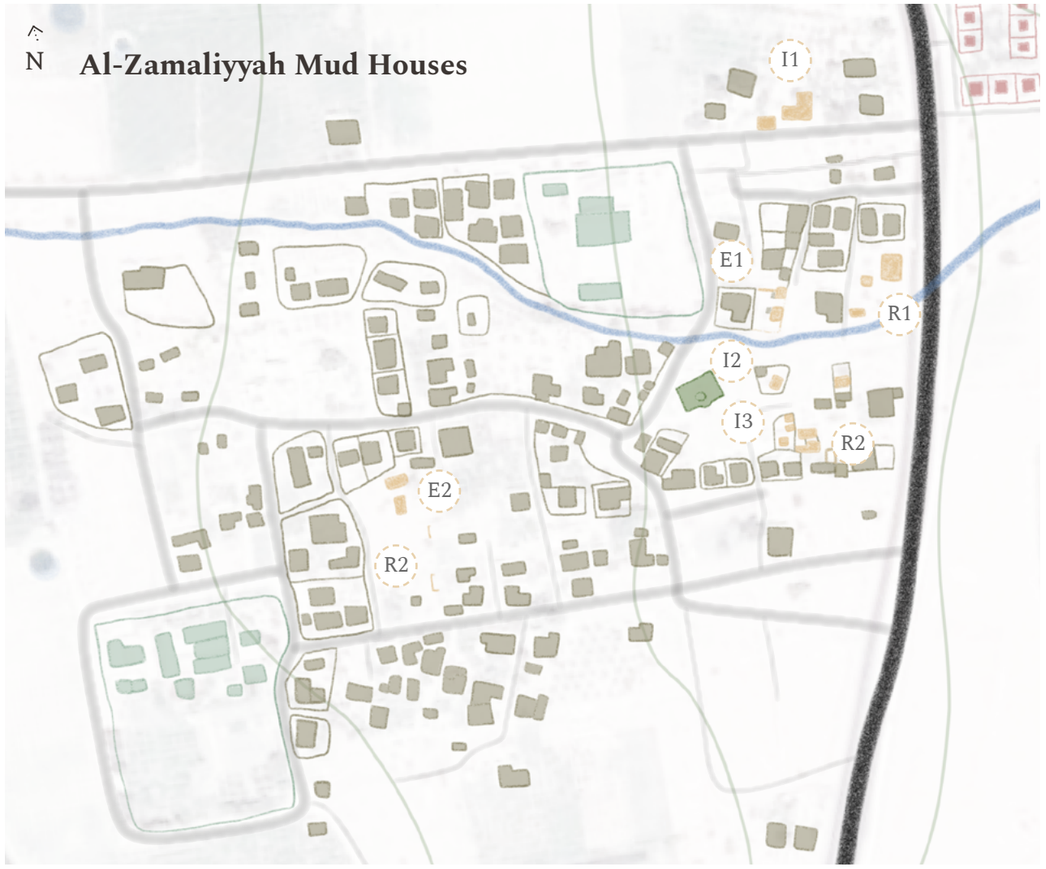
As told by Al-Zamaliyyah resident Ahmed Qasim, the mud houses built in the 1930s-1960s were the result of *ouneh*. The social practice of building and maintaining the mud houses as a community was vital to their essence and autonomy. When the first cluster of mud houses were built in the 1930s, they were highly valued for the safety and relative permanence they provided.

The mud houses in Al-Zamaliyyah were constructed utilizing the locally available resources including stone, soil, straw, water, wood, and reed. Generally, the soil of the Jordan Valley contains enough sand that it can form a strong brick with only straw and water which can both be sourced locally.[118] The mud houses follow a basic, rectangular form, and are sometimes single cell, cuboid units. At their base, the mud houses in Al-Zamaliyyah were constructed with a foundation of twenty to thirty centimeters of stone. Unlike other parts of Jordan, the village does not have an abundance of stones that can be used for building foundations. The walls were formed on top of the foundations by mud bricks, finished with a plaster including locally purchased lime. Windows were usually placed

117 El-Sharif and Muasher, "Vulnerability and Governance in the Context of Climate Change in Jordan."

118 Malhas, interview







I1 *Inhabited Houses*


R1 *Ruined Complex*


E1 *Evicted Complex*


I2 *Inhabited House*


R2 *Ruined House*


I3 *Inhabited Complex*


R3 *Ruined House*


E2 *Evicted House*

Inhabited: Houses are still in use
Evicted: Houses were abandoned following eviction orders
Ruined: Houses have already lost vital elements such as roofs or walls
House: Freestanding units
Complex: Two or more freestanding units with visible traces of an encompassing wall

Fig. 32. Index of Al-Zamaliyyah's Remaining Mud Houses

on opposite walls, with the door on a third wall to facilitate cross-ventilation. Room heights vary between three and a half meters to four and a half. The roofs were designed with a mono-pitched slope with an integrated drainage pipe to ensure proper rainwater management.
Structurally, all of the mud houses follow similar foundation, wall, and roofing systems. One unique case is the form of Ruined House 3 (R3). Typical of traditional houses found throughout Jordan,[119] but not Al-Zamaliyyah, the house doesn't use wooden beams but rather a series of arches to support the roof.

Fig. 33. Structure of Ruined Mud House 3 (R3)

The simple forms of the mud houses maintained the traditional harmony between the dweller and the built and natural environments. The open floor plans maintained the traditional fluid use of indoor space, allowing for adaptable spaces and thermal comfort as the ground provides a relatively cool surface for resting.[120]
Large yet defined outdoor spaces remained an integral part of the house, as observed in the remaining complexes. In homes where farm animals were kept within the residence such as Complex E1, the outdoor space comprises the majority of the dwelling. In other cases such as Complex I3, houses are clustered forming a small, private outdoor area in their center. The rooms here were constructed sequentially, growing to form transitional entryways for the two spaces.

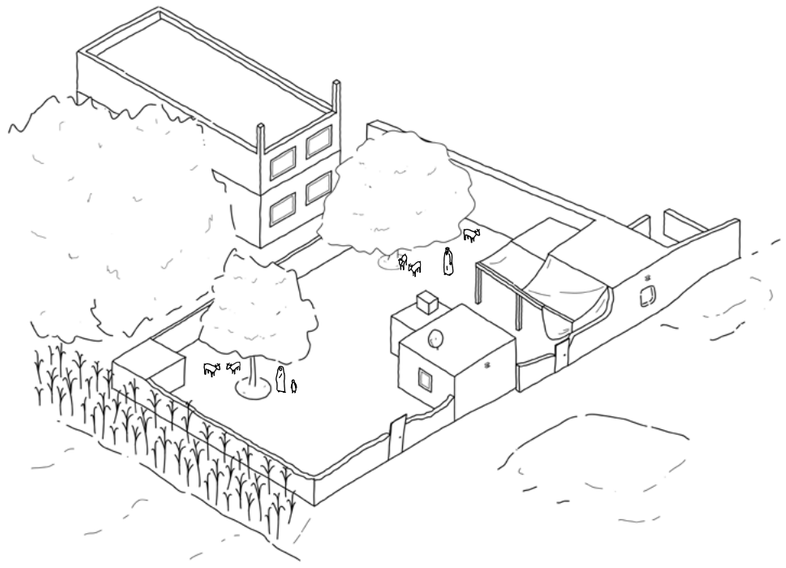


Fig. 34. Use of Complex E1 until 2021

119 Saleh Abu Tawela, "بيت "أبو قنطرة".. مفردة معمارية من معان (صور وتفاصيل)" ["Abu Qantara" House...an architectural landmark from Ma'an (photos and details)]," زمانكم [Zamancom], accessed April 28, 2025, https://www.zamancom.com/?p=2723

120 Ragette, *Traditional Domestic Architecture,* 80.



Vernacular Interventions

As the mud houses and traditions erode, vernacular interventions out of common practice become more visible. Before their eviction, the residents of complex E1 hung curtains to protect the southern facade of one mud house (Fig. 35). Although informal, this intervention displays a form of climate adaptation rooted in Bedouin practices. Another informal intervention includes the addition of small concrete block rooms adjacent to each mud house. This pattern of growth reflects the traditional progression of rooms in eventually forming a closed courtyard.

Fig. 35. Vernacular Appropriation of Mud House Ruins (E1)

Aside from abandonment, mud houses are treated with uninformed interventions posing a tangible threat to the remaining structures. Non-traditional materials such as plastic tarps and concrete are appropriated to offer solutions to some of the difficulties of mud house living. In one case (Evicted House 2 [E2]), a concrete roof and structural stone supports were added to a mud house. While the material and structural properties of stone and mud may improve the building's condition, the weight and density of concrete may inhibit the buildings breathability[121] and cause structural complications.

Fig. 36. Vernacular Concrete Block Addition of E1

While such interventions display some desire to preserve Al-Zamaliyyah's tangible heritage out of both necessity and will, they also signify the loss of intangible heritage related to mud house maintenance and restoration. Today, the majority of Al-Zamaliyyah's mud houses stand in a ruinous condition, some having no physical trace aside from a pile of dirt. In regards to the remaining mud houses, residents warn of insects and snakes seeking the comfort of its abandoned mud houses.[122] To the village's residents, mud houses no longer represent tradition or safety, but a past to grow out of. Lack of proper maintenance has led to a high risk of roof collapse, with seven of the village's remaining houses

Fig. 37. Vernacular Concrete Roof Addition of E2

121 "Breathability and old buildings," Society for the Protection of Ancient Buildings (SPAB), accessed May 10, 2025, https://www.spab.org.uk/advice/breathability-and-old-buildings

122 "الزمالية بالغور الشمالي.. بلدة مهمشة تعيش بالزمن الماضي [Al-Zamaliyyah in the Northern Jordan Valley: A Marginalized Village Living in the Past]," MENAFN, February 28, 2024, https://menafn.com/arabic/1107913051/%D8%A7%D9%84%D8%B2%D9%85%D8%A7%D9%84%D9%8A%D8%A9-%D8%A8%D8%A7%D9%84%D8%BA%D9%88%D8%B1-%D8%A7%D9%84%D8%B4%D9%85%D8%A7%D9%84%D9%8A-%D8%A8%D9%84%D8%AF%D8%A9-%D9%85%D9%87%D9%85%D8%B4%D8%A9-%D8%AA%D8%B9%D9%8A%D8%B4-%D8%A8%D8%A7%D9%84%D8%B2%D9%85%D9%86-%D8%A7%D9%84%D9%85%D8%A7%D8%B6%D9%8A

being deemed unfit for living in 2021.[123] In 2024, concerns were raised about the number of abandoned complexes around Al-Zamaliyyah following the eviction of all but two. The spaces are described as "dangerous hotspots[…]a haven for criminals and vagrants", and the only force preventing their demolition is bureaucracy. As legal owners prove difficult to reach and parts of the mud houses are rented to workers of the nearby factory, demolition of the houses is delayed.[124]
Nonetheless, the rituals and knowledge surrounding these buildings demand their preservation. While the existing mud house practices are optimized for the village's typical, semi-arid climate, their poor social perception and climate change highlight the need for their adaptation.


Fig. 38. Reinforced Concrete House with Exaggerated Parapet and Balcony and Claustra Blocks

### 5.3.2. Concrete

By the 1990s, concrete had fully replaced mud in Al-Zamaliyyah's new constructions, mirroring regional trends. Initially embraced for public structures like mosques and schools, the use of concrete in the village aligned with El-Wakil's philosophy of permanence in monuments, and impermanence in dwellings which, like humans, have a defined lifecycle.[125] It later became the default material for housing as well. Concrete became valued, above mud, for its stability and social status of modernity.

Some traditional elements have been translated into modern houses, preserving certain principles related to lifestyle and building passivity. Some houses retain the simplicity, proportions, and rectangular footprints of traditional dwellings, often due to financial limitations rather than intentional preservation. The flat roof has maintained and even expanded its social significance as a gathering and resting place used for drying crops and sleeping in the summer. Compared to the mud houses, the large span and carrying capacity of concrete roofs have increased the sociocultural significance of the rooftop. Exaggerated parapet walls are seen in Al-Zamaliyyah, common for promoting safety and visual privacy from neighbors.[126] Pitched roofs are not found within Al-Zamaliyyah, as relatively mild winters have not necessitated them, nor the imported materials such as timber and roofing tiles. Another construction element which represents continuity from tradition in Al-Zamaliyyah is the claustra block. Popular throughout Jordan in the era of Modernity, claustra or breeze blocks function similarly to the traditional mashrabiya, facilitating passive cooling through its perforations, yet minimizing solar radiation and providing visual privacy. However, like mud and other low-tech solutions, they have since come to represent the lower class and have been avoided in recent years. [127]

Al-Zamaliyyah's concrete houses follow Jordan's typical modern construction: reinforced concrete frames with block infills, flat roofs, and occasional insulation layers. Flat roofs are usually reinforced with steel T-beams and infilled with concrete blocks. In some cases, walls might include a layer of polystyrene or an air gap between concrete blocks for thermal insulation.[128] When possible, a thin layer of concrete is added on top of reinforcing mesh, giving extra strength for rooftop activities. As previously mentioned, many houses remain in unfinished state for undefined periods of time. Others however, are finished with an exterior layer of cement or lime plaster, and interiors of cement or gypsum and paint.


Fig. 39. Simple Concrete House

The widespread adoption of concrete has shifted construction from a communal practice to a professionalized industry. This transition limited the financial accessibility of new houses, leading to the abandonment of important vernacular techniques like thermal massing and routine maintenance to offset new construction and material costs. The majority of Al-Zamaliyyah's concrete houses are simple structures, with an average of two stories. In some cases, families with fewer resources maintain architectural ties to traditional structures in their small scale and modesty. In such cases, certain practices like pigeon farming and herb gardening are used to increase self-sufficiency. Many of the village's smaller, single story houses, and fencing walls are constructed of a single or double layer of unfinished concrete bricks. The prolonged states of incompleteness of these structures underscores a key advantage of concrete; a house can be incomplete yet lived, gradually finished as resources allow. While concrete offers practical advantages including modularity, phased construction, and low upkeep, it comes with its own limitations. The material's disconnect from local ecology and traditions has widened the rift between residents and their built environment. Moreover, it exacerbates climate vulnerabilities and erodes knowledge of sustainable, community driven architecture. Yet, for many in Al-Zamaliyyah, concrete remains the pragmatic choice, even as it distances them from ecological harmony and communal building traditions. The possibility for incremental construction and economic survival allows families to meet immediate needs, freeing them to focus on livelihoods rather than survival. The main drawback, in this sense, is the low financial accessibility of the materials and labor. While the residents of Al-Zamaliyyah unanimously prefer reinforced concrete homes, they are not accessible to all. This situation has led to the government housing project in the village.

123 "الأغوار الشمالية: 7 منازل في قرية الزمالية آيلة للسقوط ...ووعود بالحل" [Northern Jordan Valley: 7 houses in Al-Zamaliyyah are on the Verge of Collapse...and Promises of a Solution]," الدستور [Ad-Dustour], January 2, 2022. https://www.addustour.com/articles/1259290-%D8%A7%D9%84%D8%A3%D8%BA%D9%88%D8%A7%D8%B1-%D8%A7%D9%84%D8%B4%D9%85%D8%A7%D9%84%D9%8A%D8%A9-7-%D9%85%D9%86%D8%A7%D8%B2%D9%84-%D9%81%D9%8A-%D9%82%D8%B1%D9%8A%D8%A9-%D8%A7%D9%84%D8%B2%D9%85%D8%A7%D9%84%D9%8A%D8%A9-%D8%A2%D9%8A%D9%84%D8%A9-%D9%84%D9%84%D8%B3%D9%82%D9%88%D8%B7-%D9%88%D9%88%D8%B9%D9%88%D8%AF-%D8%A8%D8%A7%D9%84%D8%AD%D9%84#:~:text=%D9%8A%D9%88%D8%A7%D8%AC%D9%87%20%D8%B3%D9%83%D8%A7%D9%86%20%D9%81%D9%8A%20%D9%85%D9%86%D8%B7%D9%82%D8%A9%20%D8%A7%D9%84%D8%B2%D9%8E%D9%91%D9%85%D9%8E%D8%A7%D9%84%D9%8A%D8%A9,%D9%85%D9%82%D8%AF%D8%B1%D8%AA%D9%87%D9%85%20%D8%B9%D9%84%D9%89%20%D8%A7%D8%B3%D8%AA%D8%A6%D8%AC%D8%A7%D8%B1%20%D9%85%D9%86%D8%B2%D9%84%20%D8%A2%D8%AE%D8%B1

124 "الزمالية بالغور الشمالي.. بلدة مهمشة تعيش بالزمن الماضي" [Al-Zamaliyyah in the Northern Jordan Valley: A Marginalized Village Living in the Past]."

125 Caravane Earth, "Documentary: Architect Abdelwahed El-Wakil وثائقي: المعماري عبدالواحد الوكيل."

126 Ragette, *Traditional Domestic Architecture,* 63.

127 Rami Daher, "Project of Modernity: A Short Lived Reality in the Arab World," (class lecture for Heritage Conservation and Management, German Jordanian University, Amman, Jordan, May 9, 2021).

128 Majd Al-Homoud and Salem Al-Oun, "Construction of Housing for Low-Cost in the Town of Al-Mansoura Northern Badia of Jordan," *Advanced Studies in Efficient Environmental Design and City Planning*, (September 25, 2021), 569-581, https://doi.org/10.1007/978-3-030-65181-7_46

The Projects

As part of the King Abdullah II Housing Project for Families in Poverty (مشروع الملك عبدالله الثاني لإسكان الأسر الفقيرة), a group of houses were constructed to the north-east of Al-Zamaliyyah's main village. The location of the project provides an example of "urban sprawl into areas of natural drainage[...]resulting in a particularly acute risk of floods for those populations."[129]

During the first phase of the project, twenty-three units were constructed, each with an area of seventy-three square meters. Each unit included a garden of 257 square meters with olive and ornamental trees surrounded by an external wall, a septic tank, a veranda, kitchen, bathroom, and three bedrooms. These houses were given to selected families from the village in 2006 and were, at the time, well-received.[130] The recipients of the houses had previously been living in mud houses which were, even before the project housings were built, deemed unfit for living and in some cases demolished.[131]

In 2021, as exhibited in the local narratives, residents of the housing project experienced several problems related to the detached nature of the projects. The question of ownership over the houses has created uncertainty around autonomy and maintenance responsibilities. Many residents lack the financial resources to operate the mechanical heating and cooling systems necessary for the concrete structure. Additionally, as many residents came from mud houses, they lack the knowledge and resources for maintaining concrete houses.

Fig. 40. Al-Zamaliyyah Housing Project

It can be concluded that the residents of Al-Zamaliyyah prefer living in concrete houses for the stability and protection provided despite the vulnerability of relying on the government and industry-based systems. Although preferred, this option remains inaccessible to some who cannot financially afford to construct, operate, and maintain concrete structures. Nonetheless, contemporary concrete houses provide immediate solutions to the most dire needs of Al-Zamaliyyah's residents. While this is extremely necessary, looking to the future, it is also necessary to ensure the social and environmental sustainability of the village. For that, the following section organizes key architectural features of concrete and mud typologies referenced thus far to inform the development of a true contemporary typology.

129 "Climate and Country Profile: Jordan," 3.

130 "ضمن مشروع «الملك عبدالله الثاني لاسكان الاسر الفقيرة» * 52 أسرة بمحافظات جرش وعجلون واربد تودع بيوت الطين" [As part of the King Abdullah II Housing Project for Families in Poverty, 52 families in the governorates of Jerash, Ajloun and Irbid Bid farewell to their Dilapidated Mud Houses]," الدستور [Ad-Dustour], August 11, 2006. https://www.addustour.com/articles/700442

131 ibid



## 5.4. Index

Based on the compiled local narratives and supporting architectural analysis, this section organizes the key strengths and weaknesses of traditional mud architecture and contemporary concrete architecture. It considers information gathered specifically from the context of Al-Zamaliyyah as well as regional examples explored throughout the thesis. This aids in determining and indexing the contemporary architectural needs in Al-Zamaliyyah, weighing the historic and contemporary attitudes towards relevant architectural features. Features which are determined to be valuable in addressing contemporary needs are outlined and later used to inform the development of a true contemporary typology.

Table 1:
**Traditional Mud Architecture**

Table 1, Traditional Mud Architecture, provides a summary of the core strengths and weaknesses of mud as a construction material, specifically for homes in the rural context of Al-Zamaliyyah.

Key Strengths

| | |
|---|---|
| Harmony | Acts as a community fixture strengthening social sustainability |
| Flexible Spaces | Adaptable interior and exterior spaces for multi-functional use supports dynamics of daily life |
| Sustainability | Uses locally sourced materials with the potential for full circularity. Climate adapted techniques minimize energy consumption |
| Historical Value | Embodies traditional wisdom |

Key Weaknesses

| | |
|---|---|
| Labor | High, continual labor demand |
| Structural Limits | Difficult to expand vertically using local materials |
| Social Stigma | Strong association with poverty |
| Knowledge Gaps | Limited number of skilled artisans<br>Limited technical knowledge in modern technology integration |



Table 2:
**Contemporary Concrete Architecture**

Table 2, Contemporary Concrete Architecture, provides a summary of the core strengths and weaknesses of concrete as a construction material, specifically for homes in the rural context of Al-Zamaliyyah.

Key Strengths

| | |
|---|---|
| Accessibility | Large existing market for labor and tools |
| Durability | Waterproof material allows for incremental growth |
| Vertical Expansion | Structural strength supports multi-story growth |
| Permanence | Low maintenance and longer lifespan gives image of modernity and security |

Key Weaknesses

| | |
|---|---|
| Poor Sustainability | High carbon footprint and inferior thermal performance |
| Cost | Materials and climate adaptation tools (insulation, mechanical heating and cooling) come at a financial cost |
| Industrial Reliance | Reliance on machinery and imported materials reduce self-sufficiency |
| Cultural Disconnect | Forgoes tradtional wisdom and spirituality<br>Compartmentalized forms reduce opportunities for social interaction |
| Accessibility | Limited logistic access to necessary materials and tools in rural areas |

Table 3:
**Contemporary Architectural Needs in the Northern Jordan Valley**

Table 3 addresses each the social and environmental needs referenced throughout the thesis with solutions found in traditional mud architecture (T) and contemporary concrete architecture (C). Solutions are addressed through keywords and clarified in the key following the table.

Planning and Spatial Organization

| Need | Description | Solution |
|---|---|---|
| Accessibility | Access to resources including materials and labor | T: *Ouneh*<br>C: Incremental growth |
| Durability | Durable and easily maintainable by residents without specialist skills<br>Roofs and foundations resistent to floods | T: *Ouneh*<br>C: Materiality, waterproofing |
| Dialogue | Fluid indoor outdoor relationship connecting building, nature, and people | T: Materiality, Courtyards and transitional spaces<br>C: Claustra blocks, landscaping, and gardening |
| Privacy | Balances distinct spaces for private living and gathering | T: Courtyards and transitional spaces<br>C: Rooftops |

Structural and Interior Needs

| Need | Description | Solution |
|---|---|---|
| Scale | Human scale with potentional for vertical expansion | T: Materiality, limited potential for vertical expansion<br>C: Materiality, potential to skew human scale |
| Energy Efficiency | Passive building design | T: Natural ventilation and thermal massing<br>C: - |
| Flexible Usage | Multi-functional and adaptable spaces | T: Flexible plans, courtyards and transitional spaces<br>C: Flexible plans, flat roofs |
| Seasonality | Season specific solutions | T: Shading devices employed in summer<br>C: Mechanical heating and cooling |

Key:

*Ouneh* refers to the traditional concept of reciprocity, in the architectural context in the communal construction and maintenance of homes.

Incremental growth refers to the construction of homes in phases as permitted by accessibility to resources (discussed in Chapters 3 and 5).

Materiality refers to the inherent qualities attributed to each material. For example, concrete is inherently lower maintenance and mud, coming from nature, has an inherent environmental cohesion.

Waterproofing materials refer to modern vapor barriers and waterproofing chemicals.



Courtyards and transitional spaces refers to the semi-outdoor spaces often the result of gradual additions (discussed in Chapter 3).

Claustra blocks, or breeze blocks refer to the modern screens constructed to function similarly to the traditional mashrabiya (discussed in Chapter 5).

Natural ventilation includes passive design strategies considering orientation in reference to sun and wind patterns, use of courtyards, windcatchers, or covered walkways to direct incoming wind.

Flexible plans refers to the general flexibility of a space.

Flat roofs refers to the traditional utilization of the rooftop in daily life (discussed in Chapter 5).

Shading devices refers to the usage of textiles such as curtains for shading (discussed in Chapter 5).

Mechanical heating and cooling refers to modern technology developed to heat and cool spaces, typically requiring an energy source.

CHAPTER 6

# Design Approach

*The greatest barriers to realizing the potential of local initiative, the energy on which sustainable development depends, are in our heads.*[132]

(Turner, 1993)

The following chapter includes descriptions of a theoretical adaptive reuse framework and concept development, aiming to implement the thesis finding in an architectural project. The thesis findings related to contemporary housing needs in Al-Zamaliyyah (see Table 3) highlight the need for a balance between mud and concrete typologies. As such, a series of three housing typologies ranging from predominantly concrete to predominantly mud is developed through the adaptive reuse strategy of aemulatio; emulating existing features from mud and concrete typologies in Al-Zamaliyyah. This system of incremental growth helps to establish the conceptual solution positioning the house as a mediator bridging traditional and modern material, spatial, and social practices. Placed in the Evicted Complex 1 (E1), the project forms a community center for learning and gathering, cooking and dining, and resting.

## 6.1. Adaptive Reuse and Aemulatio

The mindset of adaptive reuse offers opportunities for economically, environmentally, and socially beneficial solutions in the Arab world. While adaptive reuse, in a general sense, typically involves a specific place which undergoes a transformation, the aim of this project is to advocate for the broader application of adaptive reuse principles to traditional techniques and practices, earning them contemporary applications. In this sense, the process by which Fathy compiled traditional principles for contemporary use can be seen as a basis for adaptive reuse. This approach can be equated to one of aemulatio, emulating or recreating an existing ideal.

In an emerging discourse on adaptive reuse strategies, Plevoets and van Cleempoel define aemulatio as "copy and improvement", primarily in relation to a place's "interiority" in adaptive reuse.[133] It aims

132 John Turner, "Managing the Recovery of Local Initiative," *Proceedings of the Symposium on Low Cost Housing in the Arab Region, Sana'a, 28-24 October 1992, Volume I, Volume II* (Amman: United Nations Economic and Social Commission for Western Asia (ESCWA), 1993), 188, https://digitallibrary.un.org/record/1292240?ln=en&v=pdf.

133 Bie Plevoets and Koenraad Van Cleempoel, *Adaptive Reuse of the Built Heritage: Concepts and Cases of an Emerging Discipline* (London: Routledge, 2019), 30-31.

to foster a "more poetic relationship[...]a relationship that strives for similarity[...]by incorporating the existing, hidden, or lost qualities of the building and re-establishing them in a novel way."[134] Through this project, this definition is expanded from addressing a specific building to the village's existing mud and concrete typologies. The valuable materials, techniques, and practices of these typologies (see Table 3) are set as the subject to be adaptively reused by adapting and improving traditional and modern practices to best suit contemporary social and climate needs.

### 6.2. Recommendations

Table 4:
**Design Considerations**

Table 4 correlates each architectural need outlined in Table 3 to a key goal of the thesis and a design strategy relative to aemulatio, copying and building upon the specified traditional and modern architectural features (emulated feature) to form recommendations for the development of a true contemporary housing typology.

Planning and Spatial Organization

| Need | Goal | Emulated Feature |
|---|---|---|
| Accessibility | Revive autonomy | Incremental growth and participatory approaches |
| Durability | Meet security needs | Durable and waterproof materials (CEB, lime) |
| Dialogue | Socio-cultural and environmental balance | Passive design and landscaping for bioclimatic plans |
| Privacy | Meet socio-cultural needs | Hierarchal spatial planning |

Structural and Interior Needs

| Need | Goal | Emulated Feature |
|---|---|---|
| Scale | Accommodate growth | Modern spans with traditional human scale |
| Energy Efficiency | Environmental and financial sustainability | Passive design and landscaping |
| Flexible Usage | Meet socio-cultural needs | Hierarchal spatial planning |
| Seasonality | Environmental sustainability | Vernacular interventions |

134 ibid, 31.



To combat the limited accessibility of concrete in rural areas, plans should include intentionally prolonged phasing to allow time for resources to be gathered. Additionally, as previously mentioned, reintroducing mud in the rural context would require phasing to allow for its acceptance or rejection and modification. Traditional participatory approaches involving the users in the planning, resourcing, construction, and maintenance of the house would help strengthen the community's autonomy and acceptance of the new developments.

As the traditional form of mud houses have proven to not be durable enough to meet contemporary needs, the durability of concrete should be emulated in a more accessible and environmentally friendly way. The use of compressed earth blocks (CEB), such as those developed by BC Materials[135] offers a fully circular yet durable option requiring less equipment than current concrete construction, and less labor intensity compared to traditional mud brick home construction.

Similar to the The Pavilion of Slovenia, "+/- 1°C In Search of Well-Tempered Architecture",[136] a true contemporary typology should embrace seasonality by being easily adaptable. Insights for solutions can be found in the vernacular interventions of Al-Zamaliyyah's mud houses. Traditional Bedouin principles are emulated through the use of light colored textiles providing a protective layer of the house's southern facade from solar radiation. This seasonal approach can be emulated in the winter months, as waterproof Bedouin tenting textiles can be used to protect the flat roof from deterioration from rain.

### 6.3. Concept Development: Architecture as a Mediator

This project transforms the dilapidated mud houses of Evicted Complex 1 (E1) in Al-Zamaliyyah into an evolving architectural manifesto, one that bridges the village's modern progress and traditional wisdom to meet contemporary needs. Honoring the change-based cultural and social context of the Jordan Valley, the project's concept mirrors and expands on the typical housing system of the village, utilizing intentional transitions in material, social, and spatial practices to address contemporary social and environmental needs. Through sequenced interventions, the design employs aemulatio to build on the village's existing architecture, manifested as three distinct building typologies to form a community center for learning and gathering, cooking and dining, and resting. The typologies take the site's existing mud houses as a module, forming a 4x4m building block as a basis. Together with the mud houses, the different typologies form an ensemble reflecting the "total knowledge"[137] of the village. Each of the three typologies: concrete-based, mud-based, and hybrid serves as a step in a material, spatial, and social transition, guiding the community towards balancing traditional and modern systems for social and environmental sustainability.

1. Concrete-Based Typology: Aemulatio of reinforced concrete and concrete block houses retaining high exterior connectivity and structural spans.
2. Mud-Based Typology: Aemulatio of traditional mud construction with modern reinforcements.
3. Hybrid Typology: A synthesis of the concrete and mud-based typologies.

135 See "Compressed Block 90," BC Materials https://bcmaterials.org/products/earth-block-masonry/compressed-block-90

136 "Interview: Slovenian Pavilion Reimagines Ecology in Architecture at Venice Biennale," Designboom.

137 Fathy, *Architecture for the Poor*, 24.

The project employs a phased approach that emulates incremental growth patterns, introducing one typology at a time to facilitate knowledge accumulation and social perception reform. This transitional strategy addresses Al-Zamaliyyah's specific challenges where mud construction carries negative associations, traditional knowledge has been lost, and practices like ouneh have diminished, by gradually rebuilding cultural relationships with autonomous architecture in a modern context. Each typology works to enhance the community's socio-adaptive capacity, fostering both social cohesion and climate resilience.

The material transition is paralleled by a spatial progression; the concrete-based typology maintains high exterior connectivity, the hybrid typology mediates between realms, and the mud-based typology preserves traditional interiority with minimal openings, collectively emulating the courtyard development patterns discussed in Chapters 3 and 5. The three typologies are arranged sequentially to create an experiential journey from the permeable concrete structure at the entrance, through the transitional hybrid space, to the introspective mud sanctuary, mirroring the spectrum from contemporary to traditional spatial values. This system positions the hybrid typology as a potential true contemporary solution while allowing residents to define their own contemporary by choosing between material approaches. Beyond physical design, the project revives eroded social practices through participatory construction and maintenance rituals and incremental construction phases that restore traditions like *ouneh*, creating a foundation for community-led architectural evolution.

**Phase 1: Concrete-Based Typology**
Learning and Gathering

The building provides an open space for the local community and regional mud experts to gather and exchange knowledge as the site's existing mud houses are collaboratively restored, reintroducing the craft to the village.

Acting as a familiar starting point for the village's majority currently residing in concrete houses, the concrete-based typology replicates the open, porous fabric typical of modern concrete houses in Jordan. Its large windows and glass walls make it an adaptive space that prioritizes connectivity with the exterior, easing locals into the project's broader vision. However, the warm climate necessitates the improvement of the structure's climate resilience with the introduction of a passive strategy relying on cross-ventilation and shading structures. Giving a subtle reintroduction of mud's tactile qualities on the interior, built-in furniture systems similar to those in Malhas' mud house are integrated into the building's gathering spaces (Fig. 43).

Alongside the restoration of the site's mud houses, this phase includes the restoration of the boundary wall to redefine the outdoor space and the harvesting of concrete blocks from previous vernacular interventions (see Fig. 37). Emulating these additions, the concrete-based typology is constructed adjacent to the existing mud house.

Fig. 43. Mud-Based Built-in Furniture

**Phase 2: Mud-Based Typology**
Resting

Embracing traditional mud techniques, the mud-based typology inverts Phase 1 by prioritizing a sense of interiority to foster personal connections to the predominantly mud structures. The construction, operation, and maintenance of the typology provides the opportunity for the locals to re-familiarize themselves with the craft of autonomous housing systems, forming a contemporary frame of reference for future mud based buildings.

The rooms of the mud-based typology serve as accommodation for visitors and locals, representing the bedroom of the typical housing system.

Standing in contrast to the extroverted structure of Phase 1, the mud-based typology represents the traditional end of the spectrum, building on the revitalized *ouneh* and reintroduction of mud as a

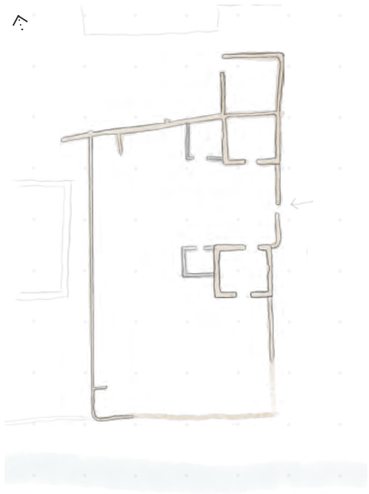


Fig. 41. Existing Site Plan of E1

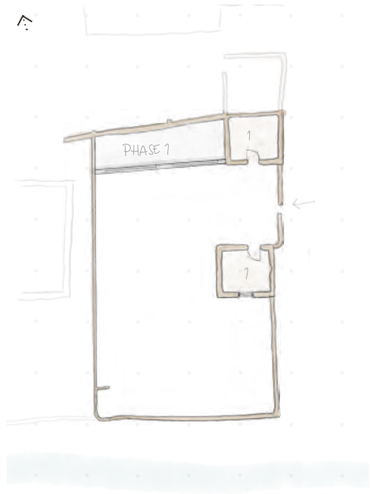



Fig. 42. Phase 1 Site Plan

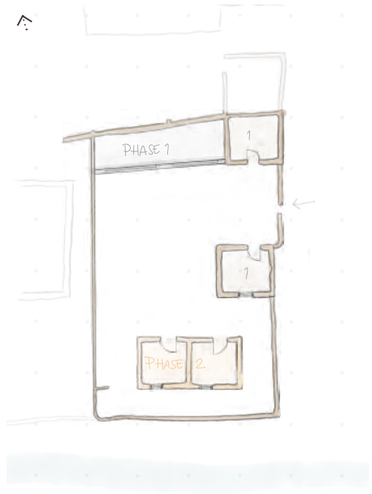



Fig. 44. Phase 2 Site Plan


Fig. 45. Phase 3 Site Plan

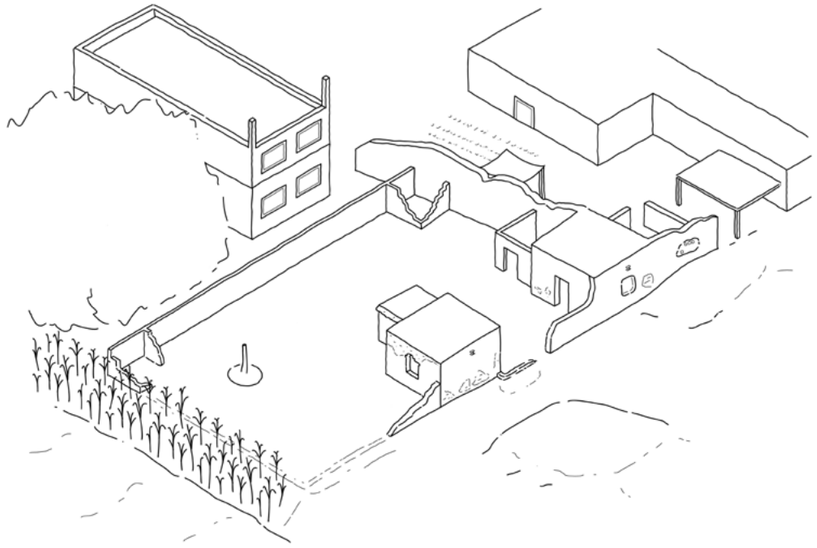
construction material. Maintaining the structure of reinforced concrete to meet contemporary needs in stability and potential for growth, the walls are composed of a mud brick infill with both interior and exterior mud plaster. The exterior use of mud plaster reintroduces maintenance rituals necessitating the full revitalization of the village's system of *ouneh*. The thick walls, minimal openings, and orientation ensure passivity through high thermal mass and cross ventilation. Additionally in this phase, two courtyards are established, forming a distinction between the open public spaces and the introverted private spaces.

**Phase 3: Hybrid Typology**
Cooking and Dining

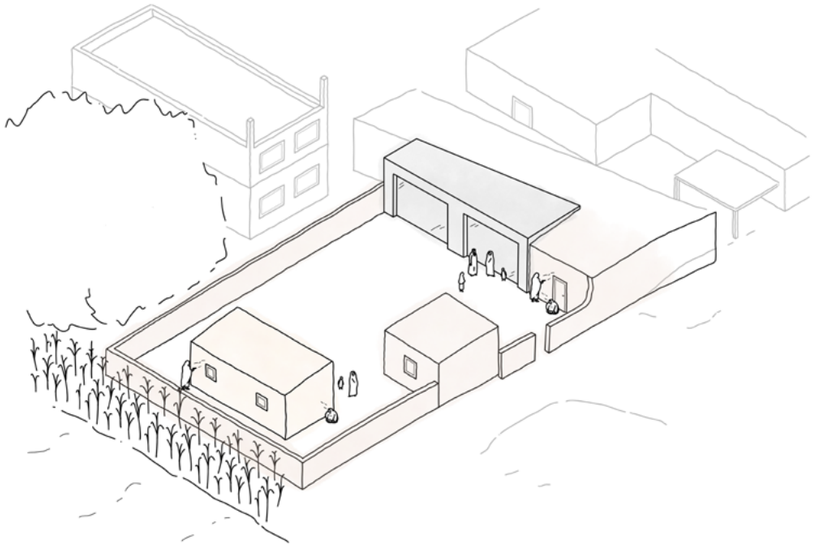
The final phase implements a hybrid typology emulating both traditional and modern systems to form the central space of the community center - the communal kitchen and dining area.
The hybrid typology merges concrete's structural reliability with mud's thermal, aesthetic, and social advantages, featuring compressed earth blocks and the use of mud plaster on the building's exterior and interior. Using the compressed earth block maintains the geometric image of the concrete houses while offering a more accessible, autonomous, and environmentally sustainable alternative to the concrete block. While the reinforced concrete foundations and structure require industry-based assistance, the construction of the compressed earth block and the house can be achieved through *ouneh*. External and internal mud plaster necessitates maintenance rituals which require the preservation of the communal practice. The mud walls utilize the thermal lag of mud, delaying heat transfer and flattening daily temperature variations. The span provided by the reinforced concrete structural system allows for a spacious flat roof terrace. The flat roof, protected by textiles based on the Bedouin tent fabric, maintains its socio-cultural function as a functional and social gathering space. Landscaping and gardening features are introduced through the initiative of the *ouneh* to further improve the site's microclimate and autonomy over garden grown foods.
Set as a middle ground between the concrete-based and mud-based typologies, the positioning of the hybrid typology establishes another transitional space, giving the site a more human scale.

### 6.4. Implications

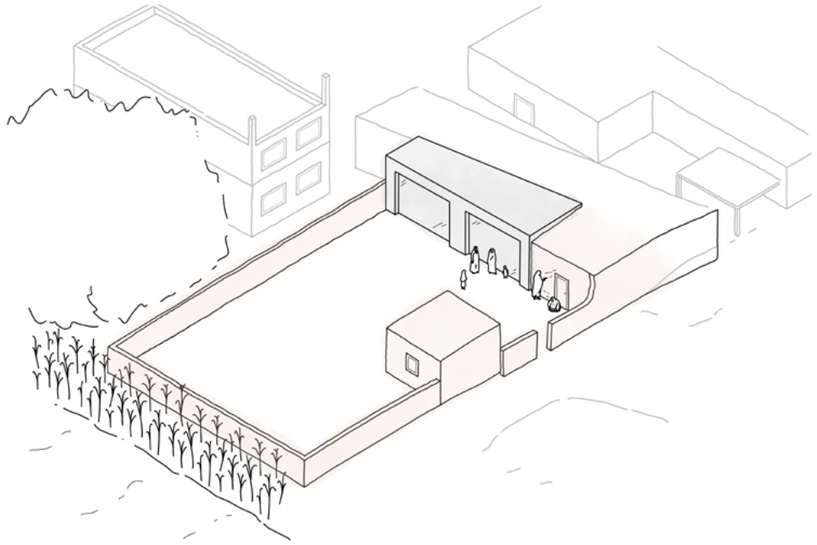
The typology which I define as the true contemporary, the hybrid typology, borrows from generations of building experience and modern technologies to balance autonomy with durability. In this way, contemporary needs are met without compromising accessibility. In contrasting the three typologies, the project demonstrates the applicability of aemulatio to both of the village's main typologies, mud and concrete. Mud-based construction techniques that prioritize thermal massing and the solidity of volumes to maintain livable indoor temperatures and humidity in the village's extreme climate, minimizing reliance on active heating and cooling systems and industry materials. Concrete-based techniques provide a reliable structure and durable products with a lighter environmental impact than concrete and less labor intensity than traditional mud.
However, the project aims to provide Al-Zamaliyyah's residents with a hands-on experience intended to improve the accessibility to satisfactory housing through community autonomy. By utilizing three distinct typologies, the project emulates different phases of the village's history, allowing the residents to gain personal experiences with each housing typology. Highlighting the value of user experience, the project invites locals to decide for themselves which type represents the true contemporary. Independent of the chosen typology, the project aims to revive community based practices and educate locals on construction techniques, restoring the concept of *ouneh* and allowing autonomy among Al Zamaliyyah's inhabitants.



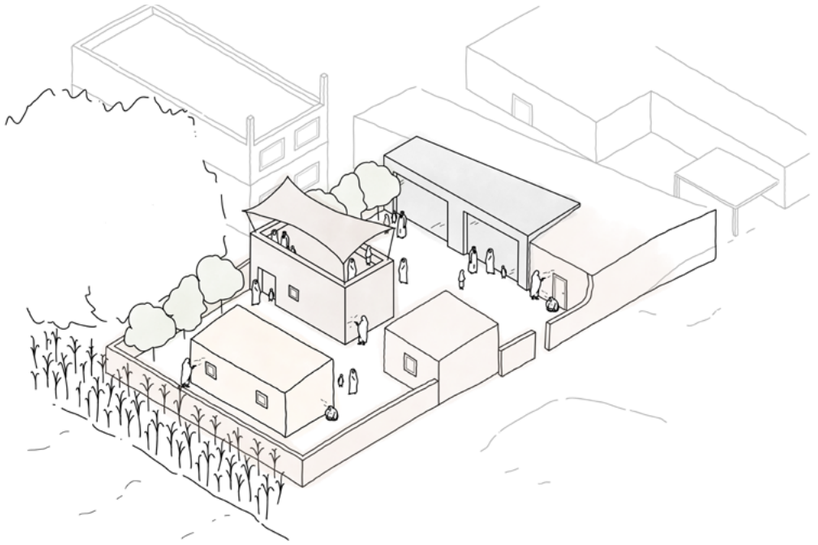
Existing Condition



Phase 2



Phase 1



Phase 3

Fig. 46. Axonometric Phasing Plan

CHAPTER 7

# Conclusion

## 7.1. Overview

Exploring applications of mud in theory and practice in the Arab and Western world, the literature review has shown the gap between the literate and the vernacular, and its relevance to the current statuses of mud. While use of mud in the literate spheres has been intended to honor its heritage and traditions, it has instead established a gap between its professional and vernacular applications. Analyzing the social and environmental context of the Jordan Valley, it was found that recent and anticipated changes in the Jordan Valley's climate and materialistic social values have both necessitated and outdated the region's traditional mud houses. Reviewing Fathy's theories on tradition and contemporaneity, the impact of reduced social and environmental sustainability in the Jordan Valley has demonstrated the need for a new approach to a true contemporary in rural housing. As observed through local narratives, residents of mud houses and concrete government projects in Al-Zamaliyyah have voiced concerns about their lack of autonomy and not being able to maintain their houses themselves. Residents of modern concrete houses face the lack of accessibility in the construction, operation, and maintenance of concrete structures especially given the rural nature and extreme climate of the Jordan Valley. The residents of mud houses however, face the additional burden of the negative social stigmas associated with the material. Additionally, as the mud houses were found to be previously built and maintained through the community's practice, the current lack of *ouneh* has led to their rapid deterioration.
Based on this information, the theoretical adaptive reuse framework of aemulatio is determined to be applicable for balancing the valuable features of mud and concrete architecture, allowing for environmental and social sustainability. Through the foundational stages of an architectural project, the final chapter implements aemulatio to illustrate the concept development of the house as a transition between materials, spaces, and social constructs. The project's emulation of existing traditional and modern architecture aims to revitalize and solidify social and environmental sustainability in the village.

## 7.2. Critical Examination

While the reasons for the intended residents of New Gourna rejecting the village have not been determined in the thesis, it still takes the advice of Fathy as a basis for achieving a similar goal by rejecting existing approaches to rural reform. Applying his philosophy towards tradition written during the time of New Gourna in *Architecture for the Poor*, the thesis risks repeating the oversights of Fathy's project. To mitigate this, it takes his later formed theory of contemporaneity and a true contemporary as the goal of the project.
His view of tradition, defining it as fickle, turned out to be true in an unforeseen way that limited the livability of the project. His putting his theory into practice in New Gourna allowed for it to be tested and to a certain extent, rejected given contemporary standards for housing. While his theory on contemporaneity was formed later on, it has not been tested in a targeted way such as tradition was in New Gourna. However, rather than letting the shortcomings of New Gourna define Fathy's work, this thesis takes the project and Fathy's subsequent ideas of contemporary architecture as an example to learn from.
Additionally, while the thesis advocates for a bottom-up approach, the output is mainly catered towards academic and architectural audiences, especially as, like Fathy's work, it is written in English and therefore even less accessible to the Arabic speaking rural populations. Nevertheless, the thesis is rooted in empathy with the testaments of Al-Zamaliyyah's residents, with their struggles in both living in mud houses and adapting to concrete houses. When feasible, images and illustrations are used to exemplify main talking points, however the academic nature of the thesis maintains in contrast to the user-led approach it ultimately aims for.

## 7.3. Outlook

As seen in New Gourna, well meaning and thought out theories do not always achieve their desired effect in practice. As such, further steps testing the theoretical framework outlined in Chapter 6 in Al-Zamaliyyah would be necessary to provide a proof of concept. This would also allow for the desired user participation and real world impact referenced in the critical examination.
Parts of this thesis have been submitted to the 14th World Congress on Earthen Architecture, aiming to contribute to the congress' emphasis on contemporary approaches to adapting historic mud architecture. Additionally, it would be beneficial to apply the framework used in this thesis to similar cases with the shared goal of working towards a true contemporary which balances tradition and modernity for social and environmental sustainability.

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# List of Figures