Architectural Histories

Al Asali, W and Shahin, I. 2026. Housing, Scarcity, and Vaulted Architecture in 1980s Syria. *Architectural Histories*, 14(1): pp. 1–33. DOI: https://doi.org/10.16995/ah.17610

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Housing, Scarcity, and Vaulted Architecture in 1980s Syria

Wesam Al Asali, IE School of Architecture and Design, IE University, Segovia, Spain, wesam.alasali@ie.edu
Iyas Shahin, Faculty of Architecture, Damascus University, Damascus, Syria, iyas.shahin@damascusuniversity.edu.sy

In the late 1980s, Syria's architectural landscape underwent a pivotal transformation driven by the severe economic challenges resulting from sanctions and regional conflicts. The scarcity of imported materials, particularly steel, rendered conventional reinforced concrete construction prohibitively expensive. In response, Syrian builders and architects began to embrace traditional techniques and local materials, focusing on compression-only structures, barrel and cross vaults supported by load-bearing walls in particular. Beyond serving their technical function, these vaults became instrumental in affordable housing and contributed to a broader discourse on establishing a distinct architectural 'identity' for the country's rural areas. This paper examines various projects, initiatives, and movements related to vaulted affordable housing in Syria within both regional and national contexts. The research draws on primary data, personal archives, and records from architects and engineers who participated in these projects between 1982 and 1995. One of the most significant of these initiatives was the Al-Sharqyat housing project in the western suburb of Damascus, leading to its institutionalisation and large-scale implementation. As a state-led endeavour by the newly formed Military Housing Establishment, Al-Sharqyat exemplified how scarcity pushed Syrian architects to move beyond standardised methods and instead adopt experimental building practices. This paper explores the factors that led to the inception of the Al-Sharqyat project, its subsequent challenges, and eventual failure, with a focus on the project's urban, architectural, and construction dimensions. These vaulted houses, which once encapsulated the evolving expressions of late Syrian modernist architecture—an area of architectural history that remains relatively unexplored—are currently being transformed.

Keywords: Syria, gated community, vernacular architecture, housing, vaults, Hassan Fathy

Introduction

About eighteen kilometres west of Damascus lies a village called Qura Al-Assad (Village of Al-Assad), built in the 20th century. The name refers to the former Syrian president, Hafez Al-Assad, under whose rule this and other satellite villages were constructed in different regions of the country. This form of urbanisation, with opulent homes, open green parks, shopping centres, and affluent residents, may be the closest representation of a gated community to be found in Syria. But the sense of luxury becomes more palpable as one passes through the area called Al-Sharqyat (the Orientals), a neighbourhood of standalone houses whose name derives from their domed roofs and arched entrances, some of which are reflected in pools and fountains at the entrances of these villas.

However, Al-Sharqyat was never intended to be a luxury housing project. It was initially designed to be affordable housing for middle-class workers. The arched formations in a U-shaped, one-storey house with an open courtyard were not inspired by Umayyad or Ottoman palaces or some imagined Oriental tale; rather, they stem from construction methods aimed at reducing costs. The arches and vaults were practical architectural adaptations particular to the 1980s, allowing for construction without the need for imported steel, making residential architecture feasible. This architectural-economic experiment, however, was short-lived, as the construction of these houses faced significant challenges when transitioning from the experimental phase to mass production. At this point, the purpose of new urban satellite areas shifted from supporting middle-income residents to attracting investments from Syrian expatriates. The discourse around vaulted housing also shifted from a focus on cost-reducing techniques to heritage-inspired forms that evoke an idealised past.

Al-Sharqyat was part of a larger state-led housing project directed by the Military Housing Association, commonly known as Milihouse, a military unit established in 1975 to assume responsibility for provision of the country's housing; it later expanded to become a state-led contractor responsible for much of the country's construction work. In the early 1980s, Milihouse was in the process of building two villages outside Damascus and Aleppo, named respectively Qura Al-Dimas (then Qura Al-Assad, and now Qura Al-Sham) and Al-Hamadanya. Al-Sharqyat was a subtheme in these villages for vaulted and affordable single-family homes 'à la Oriental', an expression Milihouse architects used to describe houses with vaults.

The vault — both as an architectural form and a conceptual idea — lies at the heart of this experience. Syria faced pronounced economic challenges in the latter half of the 1980s, compounded by US sanctions initiated in December 1979 and heightened in 1986, along with internal and regional conflicts (Human Rights Watch 1989; Sinjab 2008). Some building materials became scarce. While Syrian cement factories remained

operational, steel was difficult to import. This scarcity of imported materials made the once prevalent and accessible reinforced concrete construction very expensive. Builders and architects found themselves navigating new methods of making, regulating, and thinking about architecture, pushing their work towards new-old boundaries. They believed that experimenting with traditional construction and local materials could lead to a solution for accessible housing amidst the sanctions. By disregarding steel, the construction of houses had to rely on compression-only structures with barrel and cross vaults sitting on load-bearing walls. However, vaults were not only technical solutions but also tools to navigate the meaning of the 'rural'. In fact, during the 1980s, when Al-Sharqyat was being built, the use of vaults for housing was a topic of debate in the Middle East and North Africa, highlighted by the architecture of prominent figures such as Hassan Fathy and Nader Khalili. In Syria, several architects were already working with brick and stone for construction without steel.

Among these individual and collective efforts of this period, Al-Sharqyat stood as a central initiative, as it was institutionalised and executed at a large scale. The story of Al-Sharqyat encapsulates late Syrian modernist architecture that was related to the 'new vernacular', which evolved during a challenging economic period and needs to be further studied and nuanced.

Tracing a Shifting Vision: Reading Al-Sharqyat

This paper examines the case of Al-Sharqyat within its national and regional contexts, focusing on its urban, architectural, and construction dimensions. This housing project stands at the intersection of two critical threads: the emergence of gated communities in Syria and the use of vernacular architectural responses to material scarcity. At the centre of this inquiry is the vault, as both a structural technique and a symbolic form that serves as a lens through which these threads are explored. In doing so, the paper also offers a methodological contribution, proposing a productive reading of architectural history through the uses, meanings, and discourses surrounding structural and constructional elements.

The growing research on housing across the Middle East and North Africa traces how colonial, postcolonial, and neoliberal ideologies have shaped urban development. Al-Sharqyat introduces a Syrian case from the 1980s in which a housing initiative shifted from subsidised public provision to investment-oriented exclusivity. The trajectory parallels studies on these shifts in Cairo's desert cities, where urban expansion evolved from state-sponsored egalitarianism into enclaves for elites under liberalised economic policy (Denis 2006; Sims 2010). In Syria, however, the reorientation was not only market driven but also actively engineered through changes in legislation,

materials, and urban planning — transformations aligning with broader regional patterns in which housing policy was restructured to reflect new economic priorities (Ababsa and Dupret 2012; Etienne 2012).

This transformation of housing in Al-Sharqyat is shaped not only by the negotiation between users and the houses they built but also by the changes in resources and labour. As explored in Fekri Hassan and Christine Plimpton's study of New Gourna, the afterlife of Fathy's vaulted housing reveals the frictions between architectural idealism and everyday needs (Plimpton and Hassan 1987; Damluji et al. 2018). Al-Sharqyat continues this pattern, where the meaning and experience of living in vaulted houses shifted, driven by both market trends and the limitations of construction quality.

In parallel to shifting ideas of housing, Al-Sharqyat reflects another transformation in the 1980s, marked by changes in discourse around construction and local materials and exploring new vernacular paths, which will be discussed later in the article. This quest is shown in the use of vaults as a response to both technical constraints and regional traditions. The association between vaults, scarcity, and affordable housing in the Middle East predates Al-Sharqyat. In fact, this relationship in modern architectural practice emerged in colonial contexts where architects envisioned local labour (presumed to be cheap) to produce low-cost structures. In 1941, Le Corbusier proposed the Peyrissac vaulted house in Cherchell, Algeria, which he framed as a 'harmony between the countryside, the climate and tradition'. The unbuilt house was imagined to be constructed by 'indigenous' labour — a narrative that is also found in later French architectural experiments in the region. In the 1940s, Marcel Lathuilière and Roland Simounet designed transitional vaulted housing in Algeria as a fast, economical solution (Celik 1997). In post-independence Morocco, earthen vaults were prototyped in the 1960s and 1970s as part of efforts to align modernist planning with vernacular techniques (Labied 2022). These vaulted prototypes were never scaled up into widely replicable models. The 1980s discourse on Al-Sharqyat reflects a familiar arc: promising vault experiments emerged as a response to material scarcity, and individual porotypes developed in initial phases, but large-scale implementation faltered due to limited skilled labour and wavering institutional commitment. As such, the project both fits within and complicates the broader regional history of architectural experimentation caught between economic pragmatism and the appropriation of local form.

It is through this examination that the article reveals how heritage, as an architectural concept of built form, only appeared in later stages of the project, when houses needed to be marketed to the public. Such use of the term operated as a strategic device to frame what Nezar AlSayyad calls a 'constructed authenticity' (2001). Vaulted architecture was deployed to evoke a sense of timeless Syrian identity. Here, heritage was not about preserving existing monuments but rather a strategy for marketing the

housing project: a formal architectural language was created from an imagined past — a house drawn from an oriental tale. The vaulted house ceased to be a solution for low-cost construction and instead became a symbol of aspirational heritage in which spatial forms were mobilised to generate legitimacy.

Al-Sharqyat has previously appeared in two academic studies that examined the project within broader explorations of craftsmanship, vault construction, and the use of locally sourced materials. The first is Jamal Abed's master's thesis at MIT (1988), and the second is Amer Mousally's diploma dissertation at Damascus University from the same period (Abed 1988; Mousally 1988). Both were written during the early phase of the Al-Sharqyat project, before its vision was significantly altered by implementation challenges. No comprehensive study has yet traced the full arc of the project, incorporating all key actors and phases, nor has any research addressed the current condition of the vaults or how residents have modified them over time.

Nearly forty years after the project's inception, this new research on Al-Sharqyat relies on a combination of sources for data collection: institutional and personal archives, site visits to the area in its current state, and interviews with architects and engineers who either participated in or were very familiar with the project. This multi-scalar approach was necessary to compensate for the limitations inherent in each type of source. Institutional archives — particularly those of the Faculty of Architecture at Damascus University and the Syndicate of Engineers in Damascus — provided key materials, as did Mousally's diploma thesis and several issues of *Al-Muhandis Al-Arabi* (The Arab Engineer) that feature articles on the work of Syrian and Arab architects in affordable housing. The Syndicate's archive also includes promotional pamphlets produced by Milihouse and directed at Syrian expatriates, catalogued under 'Milihouse Publications', although the archive's documentation of the project is not comprehensive. Personal archives, primarily from architects and engineers affiliated with Milihouse, offered firsthand materials, such as drawings, site photographs, and internal memos; however, these are uneven in coverage, informally preserved, and remain largely uncatalogued. Interviews of individuals involved in the project through their work at Milihouse were conducted in person and in Arabic between 2017 and 2019, and included key figures such as engineer Aladdin Al-Salti and architects Maen Abaza and Hisham Al-Khayyat,. Additional interviews were conducted with architects Jamal Ahmar and Ziad Muhanna, who were familiar with the project's trajectory. These interviews added an interpretive layer — insight into the decision-making processes, institutional dynamics, and lived experiences surrounding the project. Finally, field visits conducted between 2017 and 2018 allowed for direct observation of the current state of the built environment, revealing how residents have adapted, preserved, or modified the original vault-based architecture.

Together, these sources enabled a triangulated reading of Al-Sharqyat that was not possible through any single archive or method alone, allowing for a more complete and nuanced reconstruction of one of Syria's most ambitious experiments in affordable, locally rooted architectural production. To complement archival research and fieldwork, this study also employed architectural redrawing and digital modelling as tools of investigation. Based on site visits, archival fragments, aerial photos, and photographs, key building prototypes that were built during the early phases of Al-Sharqyat were reconstructed through measured drawings and 3D models. These models, central to the investigation, helped to visualise the structural geometry of the vaults, assess construction sequences, and clarify deviations introduced through modifications by residents over time . Drawing thus became both a method of recovering lost design information and a means by which to critically interpret the architectural logic of the project.

Syrian Vaulted Architecture: From Regionalism to the New Vernacular

With industrial advances in Europe between 1890 and World War II, regionalist approaches to architecture emerged that emphasised local identity, customs, and materials in response to nationalism (Storm 2003). Movements such as Noucentisme in Catalonia and regionalism in France interpreted vernacular forms within industrial contexts (Falgàs 2009). Modernism after World War II shifted the focus to global and supranational architecture, until the 1960s brought renewed interest in centre–periphery dynamics and critiques of universalism (Batur 2014). Figures like Sigfried Giedion and Pietro Belluschi raised early questions, later echoed in Bernard Rudofsky's 1964 exhibition *Architecture Without Architects*, which highlighted 'authorless' traditions. At the same time, scholarship by Paul Oliver and Amos Rapoport grounded vernacular architecture as culturally and socially embedded practice (Rapoport 1969; Oliver 1978).

The term vernacular, from the Latin *vernaculus* (native), implies not only local building practices but also deeper questions of tradition, modernity, and authenticity (Simon 2006). In the 1980s, Kenneth Frampton's theory of Critical Regionalism sought to resist the homogenising forces of globalisation by advocating for context-sensitive, culturally rooted design (Frampton 1983).

Syria was not very far from this rethinking of its cultural and natural resources in architecture. In the early 1980s, the faculty of architecture at Damascus University had been established as an independent entity, twenty years after it was constituted as part of the engineering faculty, following the establishment of the fine arts faculty (interview, Ahmar 2018). Both professors and their students were influenced by the movements of architecture that advocated building from within. However, the

influence came not from writings or studies, such as those by Oliver and Rapoport, but from projects happening nearby, specifically the work by Nader Khalili in Iran and Hassan Fathy in Egypt (Mousally 1988: 55–75; interview, Ahmar 2018). In particular, the experiences of Fathy found echoes in the architectural discourse in the faculty of architecture. By the 1980s, Fathy had built many of his mud-brick projects and written his book *Architecture of the Poor*; in 1980 he received the Aga Khan Award for Achievement, making his work yet more visible. Some graduation projects were directly affected by Fathy's work and his argument about designing with and not against climate. Nasser Rabbat, an architectural historian and Agha Khan Professor at MIT, stated that his graduation project of 1979 was inspired by Fathy's book, after which Rabbat decided to design self-sufficient rural housing (Al Araby tv 2018).

However, this rationalisation of the use of materials was also utilitarian, given the economic crisis in the country due to the sanctions; the industrial and economic measures by the Syrian governments also led to a severe scarcity of resources (Abed 1988: 36). This was explicitly expressed in the interviews with architects from Milihouse. Maen Abaza recalled how 'steel was very scarce', and Bashar Khayyat elaborated on scarcity, saying that 'the use of local materials was an attempt to rely again on our own resources'. This scarcity was seen as an opportunity to build locally and to connect with vernacular construction techniques. Indeed, in Mousally's introduction to his master's thesis, he observed that the problem is not that the country needed 'steel to cover roofs'; rather, he quips, 'Necessity is the mother of invention', advocating the solution to build local, and says that 'there are many examples around the world that demonstrate the strength and artistry of local materials' (Mousally 1988: 2).

That all previous experiments in the 1980s took place in rural settings is not coincidental. The architects' visions for affordable housing, then called Al-Sakan al-Iqtiṣādī (economic housing), differed between villages and cities. In rural housing, affordability was rooted in the use of local materials and labour; a house should be shaped from what exists on the site, built by its residents, and should include large outdoor spaces for agricultural or animal-related activities. In urban housing, affordability was always proposed via mid-rise, high-density buildings that were intended to mitigate the expansion of informal settlements around major cities in Syria. The material for such construction was thus was typically envisioned as standardised and prefabricated elements of steel and reinforced concrete (Jolha and Jolha 1984).

When discussing affordable housing solutions in the country, therefore, a clear distinction was made between rural housing and urban public housing. While the urban solution centred around efficiency and density, the rural approach was imbued with emotions about pre-industrial society. The village was seen as the only

place capable of preserving the identity of Syrian society, which was perceived as inevitably lost in urban centres. Cities were imagined as 'modern', while villages were seen as 'vernacular'.

The rural house was the main domain for reconnecting with the vernacular. The use of local materials in rural construction provides dignified housing in villages to mitigate migration to the major cities. As a way to disregard steel, a vaulted structure can rely only on compression forces and does not need steel for reinforcement. Vaults and domes were therefore one of the main areas for homegrown solutions. Mousally believed that 'by using locally available materials and existing skills, and by adapting them to construct arches, domes, and vaults, we can create architecture' (1988: 4).

In Aleppo, Rabie Dahman developed a house with a folded vault of cement and stone (**Figure 1**). In Damascus, Khaled Fahham built a small house with vaults using volcanic stone and mortar set upon on walls of rubble concrete (**Figure 2**). Vaults were made using

Figure 1: A vaulted house in Syria, built between 1987 and 1988, designed by Rabie Dahman. The house's roof is folded and made of cement blocks, reducing the need for steel reinforcement. Source: Mousally (1988: 78).

Figure 2: This rural house in Syria, built between 1987 and 1988 by Khaled Al Fahham, is of stone and cement vaults. Source: Mousally (1988: 84).

shuttering on which the concrete and stone were cast and then left without finishing. Fahham called these 'modern rural houses' that, he proposed, were the result of the 'current skill and quality of work in the absence of technology' to prevent the 'chaotic import of urban houses into the countryside' (Mousally 1988: 80).

Another, larger endeavour went beyond housing: the construction of an industrial and agricultural facility near Damascus called Al-Khaldiya Farm (for the Arab Association for Agricultural Technology). The project's design was led by Abd Alfattah Iyaso, Andre Mashaqa, and Amer Mousally. The facility is about 826 m^2 and comprises two buildings, one for poultry farming (790 m^2) and the other a guard house (36 m^2). The vaults in the projects, which were essential, were geometrically more elaborate than the previous two examples, with crossed vaults and intersecting domes. The architects used terracotta tile, a new material in Syrian architecture that was first produced in the early 1980s (**Figure 3**). The architects compared their terracotta vault over a large span with its reinforced construction, concluding an almost 50% cost reduction (Mousally 1988: 87).

Figure 3: This vaulted project in Syria, built between 1987 and 1988, is the Al-Khaldiya Farm, designed by Abd Alfattah Iyas, Andre Mashaqa, and Amer Mousally. The structure's diaphragm vault is of brick arches with barrel vaults. Source: Mousally (1988: 92).

One of the most important examples of vaulted housing from this period, however, is by the brothers Raeef, Ziad, and Rafee Mouhanna, who developed a system of vaulted housing using the traditional architecture of basalt stone in southern Syria (**Figure 4**). Their system won an Aga Khan Award for Architecture (1990–1992 cycle), together with the public school, As-Suwayda, that they built using the system (Steele 1992: 62). Unlike the experimental projects mentioned earlier, the series of houses the Mouhannas built based upon their system has developed to become finely detailed and is supplemented with a study of material sourcing and optimisation, where the geometry and the material of the shell surface (uncut thin basalt stone called *Raqrāq*) significantly minimises the use of cement. The brothers' research on vaults had an indirect connection with Al-Sharqyat and Milihouse, as the brothers collaborated with the latter to build military hangers and dorms across the country (interview, Mouhanna 2018).

However, these vernacular-based designs for affordable rural housing were no less of an invention than the prefabricated concrete urban blocks themselves. The new use of local materials and architectural techniques resulted in a correspondingly

Figure 4: The vaulted system of basalt stone, developed by the Mouhanna brothers (Raeef, Ziad, and Rafee), is here applied to a house they designed in As-Suwayda, Syria, in the late 1980s. Source: Archive of Ziad Mouhanna, 1988.

novel form of housing that had little in common with traditional or vernacular architecture, despite claims to the contrary. Fahham's claim is that arches and vaults exist in palaces and public buildings and can be imported for the use of affordable housing. The architects of Al-Khaldiya Farm acknowledged that, unlike the common concrete construction, arches and vaults entailed a new 'rural architectural style' (Mousally 1988: 80, 86).

The idea of affordable rural housing was thus not a preservationist approach, as it did not aim to replicate or extend the life of the *existing* vernacular architecture in these villages. Instead, this 'new vernacular' was seen as a solution where the traditional model could be replaced using new materials and techniques to create durable, thermally insulated, and low-cost housing with good services (Jolha and Jolha 1984).

Yet another reason behind the focus on rural areas as a field for experimentation was the lack of strict regulations. Since few such rules existed in villages, Syrian architects could more easily experiment with materials, structures, and designs for affordable rural houses. The use of a vault, a structural element that is more difficult to measure and standardise than a reinforced concrete roof, necessitated experimentation and became the most common solution for replacing flat concrete slabs.

As noted, these emerging forms of domes and vaults were not traditionally associated with Syrian architecture, in which there is no deep-rooted tradition of vaulted structures. Most Syrian vernacular houses feature flat roofs made with whole-timber poplar. However, domes have long been used for public and religious buildings, such as souks, mosques, and hammams, and for some existing vernacular housing, such as the mud houses in northern Syria, studies of which from 1980 were mainly for documentation purposes (Aljundi 1984; Jäger 2012).

Therefore, these new vaulted housing experiments aligned with the 1980s approach to 'locally appropriate architecture', as championed by figures like Hassan Fathy in Egypt. Fathy's advocacy for vaults and domes as solutions for rural and environmentally sensible housing resonated strongly in the architectural experiments of Syria during this period.

If the pairing of low cost with rural housing in 1980s Syria enabled the emergence of vaults in areas away from strict urban regulations, the Milihouse vaulted housing stands as a key case from this period. The adoption of new vaulting techniques was facilitated by a centralised government, which broke free from existing regulations and paved the way for locally developed materials to be integrated into large-scale real estate developments.

Between Affordability and Luxury: Syria's 1980s Urban Villages

The period between 1975 and 1995 was a dynamic one for suburban developments in Syria, under the Al-Baath regime. Various housing projects emerged on the outskirts of cities, some of which were thematic and linked to specific associations of public sector workers, such as doctors, engineers, and builders. Other projects were categorised by income levels, ranging from low to high (Al Salti 1997).

Amid this surge of new suburbs, emerging governmental construction entities played a centralised role in planning and construction. In the early 1970s, all construction work began to be consolidated within military entities. In 1972, a governmental decree established the Military Construction Establishment, known as MATAA, to oversee all infrastructural work in the country ('Military Construction Establishment', 1983). This was followed in 1975 by another decree that created Milihouse (OpenSanctions.org 1975). Although Milihouse was initially established to provide housing for personnel in the Ministry of Defence, it soon became the central entity responsible for building all governmental and public projects across the country.

As part of a totalitarian establishment, Milihouse, under the lead of Colonel Khalil Bahloul, had total autonomy. Bahloul was an influential figure, and Milihouse had significant control over materials, fabrications, and construction. Decisions were often

made internally and away from the centralisation of the ruling Baath regime (interview, Ahmar 2018). Milihouse wielded considerable power in the shaping of housing projects in Syria during the 1980s, not only over their design and purpose but also in its own relationship with existing regulations. Changes to processes and experiments with materials could thus be made within Milihouse without referring to the Syria's general building regulations. This led to comprehensive planning that did not have its own regulations yet determined the design and volume studies for all buildings within the new suburbs, including housing blocks, individual houses, and public buildings (Salim 2010: 64–66; Zaman Al Wsl n.d.).

The northwest outskirts of Damascus were among the first areas to experience mass housing construction. Former villages like Dummar and Qudsaya, along the road to Beirut, were to be transformed into satellite towns annexed to the capital. In line with this trend, a plot of land in Dimas, 18 kilometres northwest of Damascus, was designated to become a village for architects and engineers working in the public sector (**Figure 5**). Known as Al-Dimas Village for Engineers, the project was initiated in 1980 with the goal of constructing 180 houses (Al Salti 1997). Because it was a government project, Milihouse was tasked with their construction (Salim 2010).

However, by 1982, after the initial phase of construction of 180 houses, the village's remote location made many potential buyers look elsewhere. Because of its isolation, the village lacked official public transportation and essential medical and educational services. In addition, houses that were built in this initial phase were scattered across the area, surrounded by high, solid fences that discouraged any visual or social interaction between these houses and their urban surroundings. Some of the houses were even squatted during construction (interview, Ahmar 2018). Only a few engineers — those who were eligible for a subsidised mortgage — had begun to move into the area (interview, Khayat 2018).

At the same time, due to the sanctions, the country was grappling with the challenge of retaining foreign currency. In response, Milihouse's director had a different idea for Al-Dimas: transform it into a suburb of summer houses for Syrians living abroad (Milihouse EST n.d.; interview, Abaza 2017). Milihouse promoted these houses as 'villas *a la americana*', offering expatriates a standard similar to that of the houses in their countries of residence, with the vision of providing the comfort of an American suburb in the heart of Syria (interview, Ahmar 2018). The villas in Dimas, renamed Qura Al-Assad, could only be purchased with US dollars, which helped bring much-needed foreign currency back into the country (Al Salti 1997). Qura Al-Assad was part of a broader initiative, one of ten new suburbs around Syrian cities designed to attract expatriates (Milihouse EST. 1983).

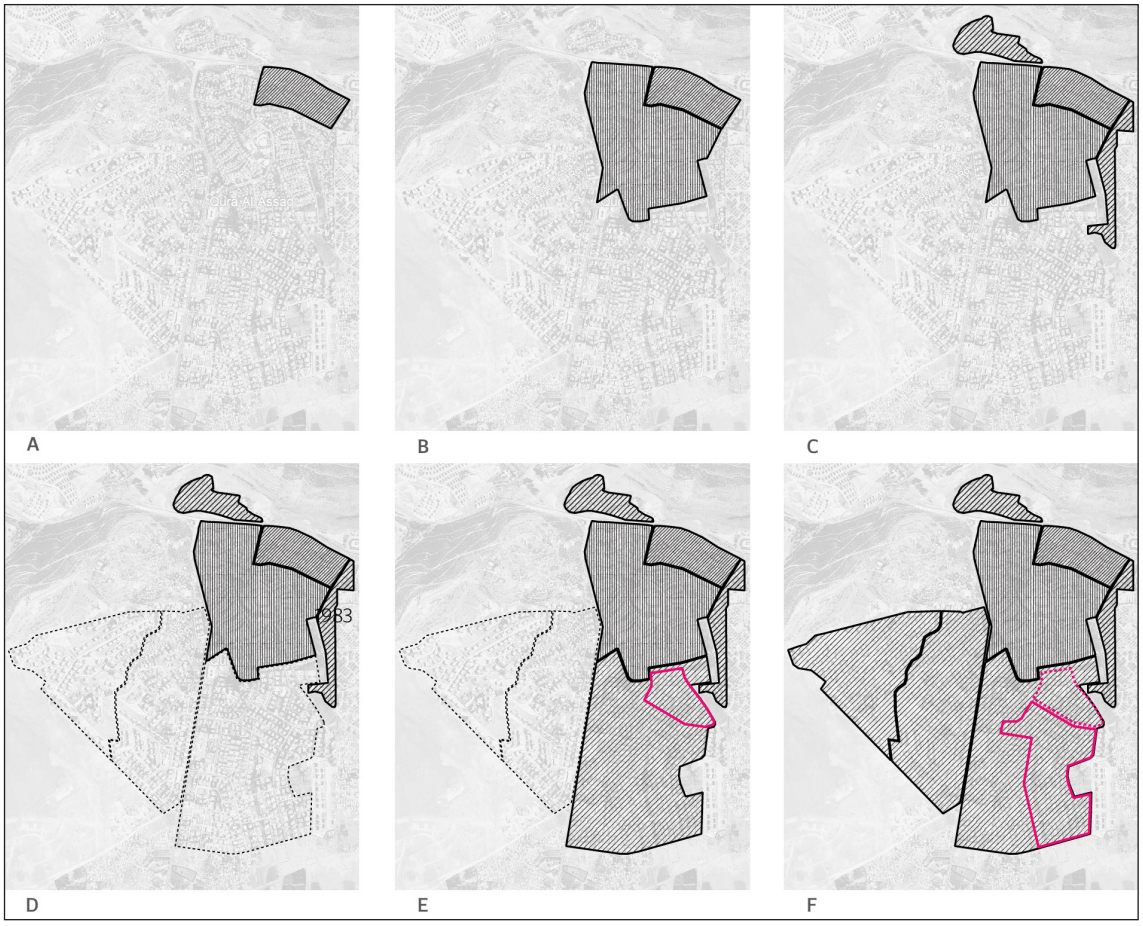

Figure 5: The urban development of Qura Al-Dima (later renamed Qura Al-Assad). A: Phase I (1980), 180 houses for workers in the public sector. B: Phase II (1982), 720 vacation houses for expats living outside Syria. C: (1983), 120 houses added to Phase II. D: Phase III and IV (1985), an expansion of 3000 houses; no vaulted houses appear in the planning for these two phases. E: Modification on Phase IV to start a pilot vaulted projects (1986–87), 65 houses in an experimental zone for a vaulted project as a cost-reduction strategy (outlined in pink). F: The completion of Phase IV (1990), with the inclusion of 200 vaulted houses (outlined in pink). Maps by Wesam Al Asali.

This shift significantly altered the nature of the project, initially conceived as a mid-cost housing initiative for public sector workers. The market for the project improved when it evolved into a seasonal village featuring luxurious vacation homes for wealthy Syrians living abroad. Two additional plots were added into the urban plans of Phase II, which originally entailed five distinct residential islands covering 77.25 hectares (Milihouse EST, n.d.). In 1985, a significant expansion added 4,000 hectares to the project, creating four additional villages adjacent to the original one.

Within this extension, Milihouse aimed to reintroduce the affordable housing scheme whose goal was to retain engineers and architects, particularly those employed by Milihouse. The strategy for cost reduction involved eliminating expensive imported

materials from the structures and finishes of the houses, with steel being the most challenging material to replace. A plot of land adjacent to Phase II was designated for continuing these experiments directly on-site. It was a perfect moment. Milihouse had already been experimenting for four years with vaulted affordable housing at expos and laboratories, and these experiments could now be extended to real-life projects in Dimas.

Al-Sharqyat: The Rise and Fall of Affordable Vaulted Housing

Milihouse Early Experiments: A Promising Research

In the mid-1970s, as Syria began facing acute shortages of imported construction materials like cement and steel and governmental institutions turned to local alternatives, a nationwide search for viable building solutions led to experiments with sand-lime and gypsum bricks, basalt and pumice-based light concrete, and, eventually, fired clay. By 1979, Milihouse took particular interest in the architectural potential of fired clay bricks. Though uncommon in Syria's stone- and unfired mud-based vernacular, the material could be domestically produced at an industrialised scale, and fired brick factories were established near lakes and riverbeds, including one in Adra, close to Damascus (Al Hasan and Al Salti 1983; Jolha and Jolha 1984).

At the Damas Expo in 1981, parallel to the work of Milihouse but under the auspices of Prime Minister Abdul Rauf Al Kasm, a team of architects and engineers from Damascus University unveiled a striking experiment: terracotta tube vaults and parabolic forms for both one-storey houses and mid-rise residential blocks (Mouhanna 2018). Designed and fabricated entirely with local materials and tools, the prototypes marked a return to compression-only construction (**Figures 6** and **7**). Rafee Mouhanna, later renowned for his work with basalt vaults in southern Syria, led the technical development of the tubes and machinery. The Expo also demonstrated a loadbearing test of a floor-system made from shallow terracotta tube vaults (**Figures 8** and **9**).

The exhibition caught the attention of Bahloul, the director of Milihouse. Seeing in it a viable path for low-cost, steel-free construction, he greenlit a follow-up initiative. Under the leadership of the engineer Aladdin Al-Salti, the Milihouse team built two experimental buildings at their Adra facility. One was constructed with load-bearing walls of terracotta brick and a concrete beam-supported flat roof. The second, which became the Milihouse headquarters, featured parabolic vaults carved from Kafar Ḥawwār sandstone — lightweight, workable, and locally sourced. Nine parallel vaults enclosed a central courtyard, an homage to the 1981 Expo design (**Figure 10**) (Al Hasan and Al Salti 1983).

Figure 6: Solutions for vaulted structures at Damascus Expos, 1981: A vaulted rural house as a pavilion in the Expo, on the cover of *Al Mouhandes Al Arabi*, the monthly journal for Syrian engineers. The vaulted house is made from terracotta tubes developed by Rafee Mouhanna. Source: Archive of Maen Abaza, 1984.

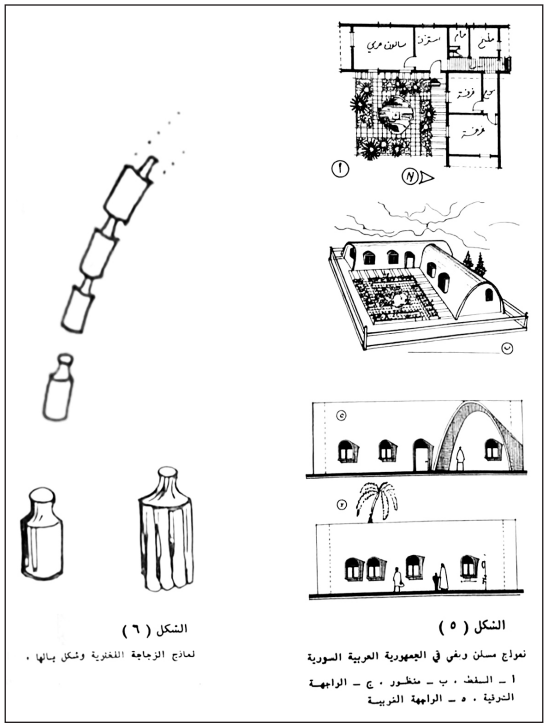

Figure 7: Drawings from Issue 76 of *Al Mouhandes Al Arabi*, the monthly journal for Syrian engineers, showing plans and details of the terracotta tube vaults for a house-pavilion at Damascus Expo in 1981. Source: Archive of Maen Abaza, 1984.

Figure 8: Solutions for vaulted structures at Damascus Expo, 1981: A demonstration and load-testing of shallow vaults from terracotta tubes for floor-systems for rural housing, made by architects from the Faculty of Architecture in Damascus University. Source: Archive of Maen Abaza, 1984.

Figure 9: Solutions for vaulted structures at Damascus Expo, 1981: Sliding formwork and terracotta tubes prepared for the shallow vaults floor-systems for rural housing, made by architects from the Faculty of Architecture in Damascus University. Source: Archive of Maen Abaza, 1984.

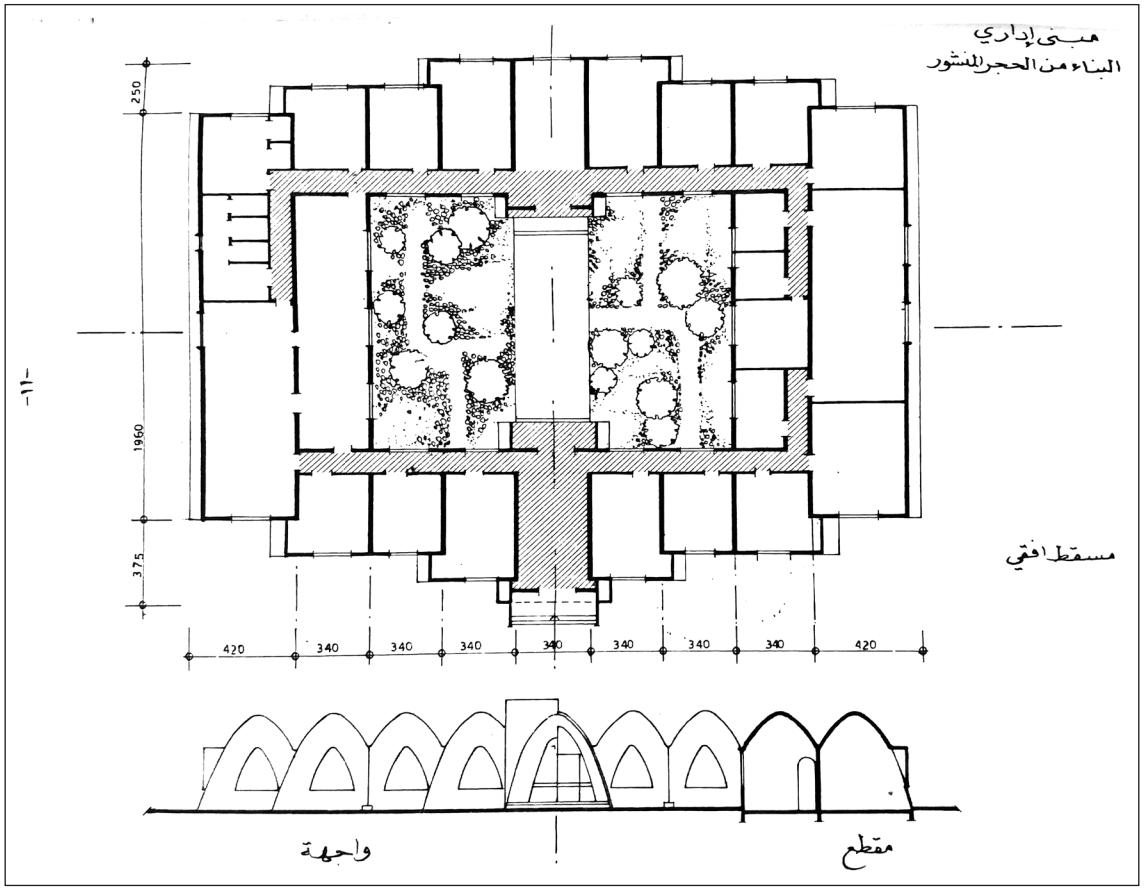

Figure 10. Milihouse headquarters in Arda. Parallel parabolic vaults made from Kafar Ḥawwār sandstone, by Aladdin Al-Salti. Source: Archive of Aladdin Al Salti, 1983.

The choice of stone was driven by necessity. Between 1980 and 1985, many material factories shut down, leaving only quarries and stone workshops in operation (Abed 1988). Milihouse worked with one of these workshops to mechanically cut the stone, calling this method of production 'industrialised cut stone'. While stone as a material was more expensive than concrete blocks — three times more, by some estimates — using it in vaults offset some of the cost by eliminating the need for steel reinforcement. The cost per square meter hovered around 1,400 Syrian pounds, compared to 1,600 for reinforced concrete (Al Hasan and Al Salti 1983).

These two experiments laid the groundwork for what would become the Al-Sharqyat initiative in Qura Al-Dimas. Inspired by the success of the Adra prototypes, a preliminary study by Al Salti laid ground for several vaulted housing typologies (**Figure 11**). Furthermore, Bahloul encouraged other Milihouse architects to develop new housing typologies using vaulted systems, as Abaza recalled:

> At that time, steel was very scarce, so he [Bahloul] designated the Sharqyat area, and the housing units there were allocated to engineers [from Milihouse]. Every month or two, he would want to reward a few engineers, so he would issue an administrative order assigning them units as a form of recognition. (interview, Abaza 2017)

Freed from standard designs, the architects saw this as a rare opportunity to experiment with geometry, structure, and material, to build not just homes but architectural ideas.

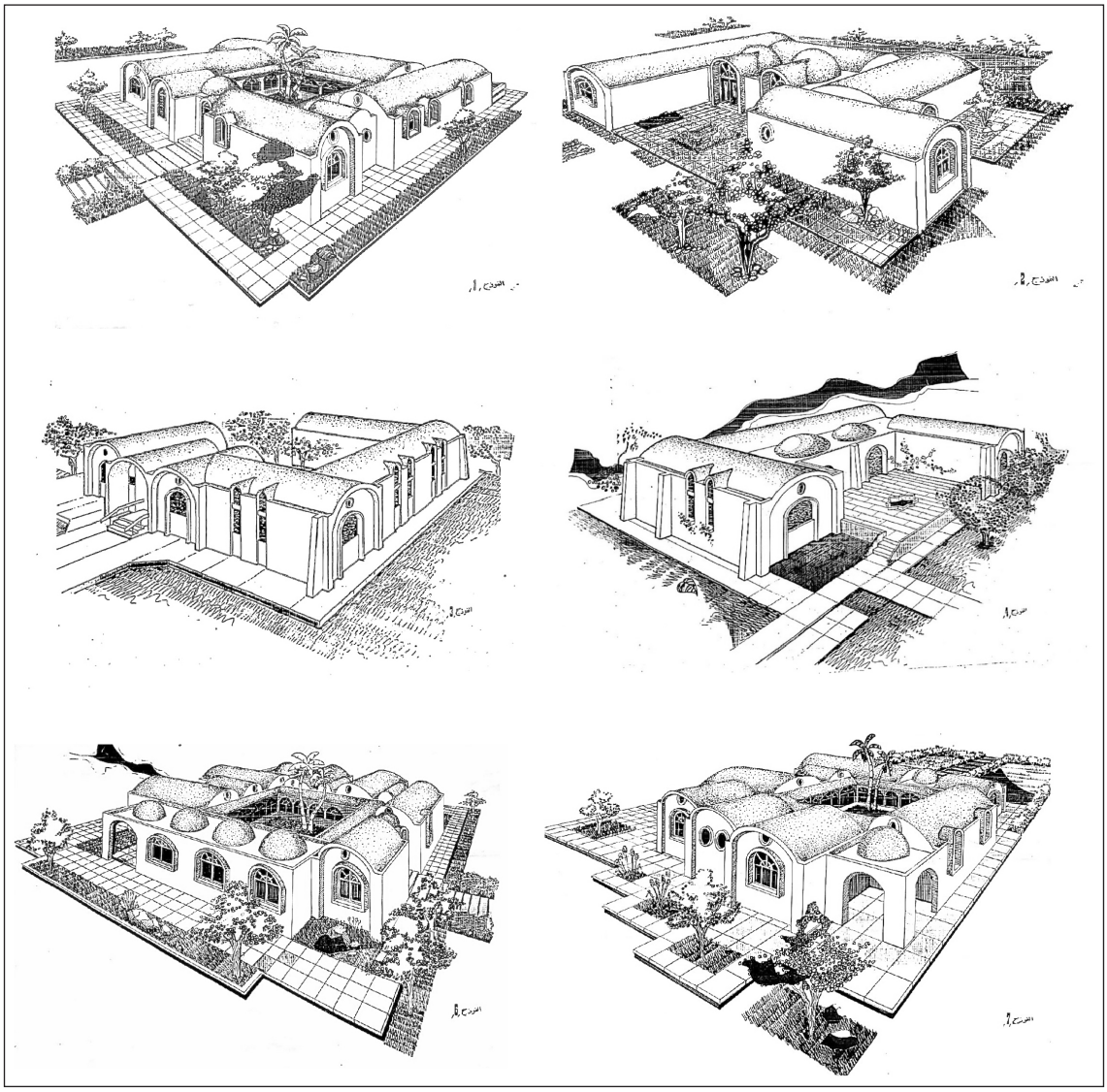

Figure 11: Examples of vaulted housing developed by Aladdin Al Salti at Milihouse. Source: Archive of Aladdin Al Salti, 1989.

Pilot Vaults: A Struggling Application

By 1985, vaults began to take shape on the ground in Qura Al-Assad (**Figures 12, 13,** and **14**). Milihouse allocated a stretch of land along the southern edge of Phase I for the experiment. The area in the plan shows five vaulted housing typologies: three single-storey U-shaped units with differing vault configurations, one arrangement with three parallel vaults, and a rare two-storey villa. The ambition was clear, but execution proved far more complex.

Figure 12: Construction of first experimental houses in Al-Sharqyat using local materials. Source: Mousally (1988: 98).

Figure 13: Construction of first experimental houses in Al-Sharqyat using local materials, and vaults for the second floor. Source: Mousally (1988: 99).

Figure 14: Interior of a vaulted space in Al-Sharqyat. Construction of first experimental houses in Al-Sharqyat using local materials, and vaults for the second floor. Source: Mousally (1988: 100).

From the outset, construction was hampered by what was really the trial and error stage of an experiment. Some vaults collapsed due to inadequate supporting substructures to manage lateral forces. Engineering consultants advised the inclusion of buttresses and reinforced ring beams, which were hastily added to stabilise the prototypes. In some cases, both systems were used together — an overcompensation that revealed a deep uncertainty about vaulting as a structural system (interview, Khayat 2018). This also drove up construction costs, undermining the affordability that vaulting was meant to achieve.

Another complication was the actual work of construction. Sliding formwork was initially used to shape the barrel vaults, but construction crews struggled with precision, resulting in uneven surfaces that required heavy plastering, creating unplanned costs (Abed 1988: 43). Ahmar described the houses built in this phase as ‘very poor … the construction was bad. Anyone who took one of those houses had to strip everything down — even if they didn’t change the design, they had to rework it

entirely' (interview, 2018). In response, Milihouse introduced full-length steel moulds with iron bars, allowing cement blocks to be laid more easily. This system posed its own challenges: when vaults intersected, the rigid moulds became impractical (**Figure 15**). Engineers began avoiding intersections, instead truncating vaults and bridging the gaps with interior walls — a shift from spatial ambition to technical compromise.

Figure 15: Formwork made by a builder at Milihouse for his own family's vaulted house. The formwork is inspired by that used in the Milihouse project. Source: Mousally (1988: 100).

Mousally noted these technical challenges in his thesis:

> The institution's experiment can be considered one of the important efforts in promoting and encouraging this method of construction within public sector projects. However, during implementation, it became clear to the institution that the approach carried several drawbacks. Most notably, the cost of the materials required to construct the vaulted roofs was not economical when compared to the costs of finishes and the additional materials needed to build thicker walls capable of withstanding the thrust forces of the vaulted structure..., there is a strong possibility that the institution will halt this type of construction. (Mousally 1988: 87)

Eventually, the pilot project resulted in the construction of 65 houses (**Figure 16**). At times, the project nearly came to a halt. To keep it moving forward, Milihouse architects simplified the designs, as later versions of drawings show, which compromised the 'architectural quality' of the proposed houses. Complex prototypes were eliminated and replaced with simpler vault configurations. Prototypes for a vaulted two-storey house were never fully realised or generalised.

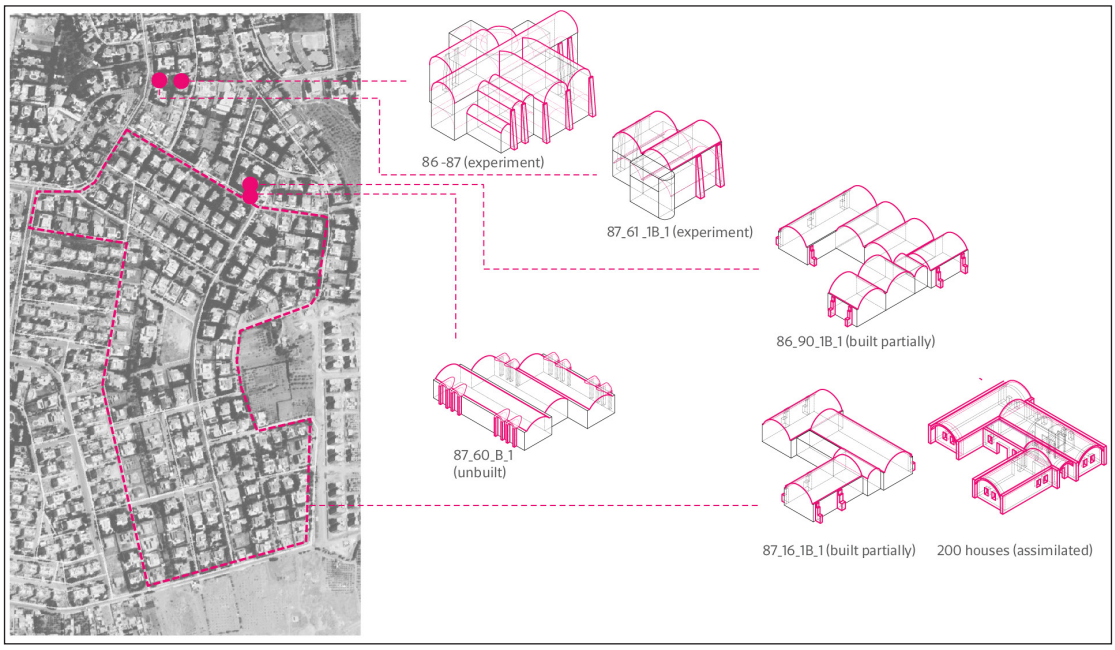

Figure 16: The development of vaulted prototypes in Al-Sharqyat: from complex and two-storey houses to a simplified, one-storey prototype (87_16_1V_1). Drawing by Wesam Al Asali.

Assimilation: A Narrowed Vision

By the late 1980s, Qura Al-Assad was no longer a remote experiment. A new bus line connected it to Damascus, and its quiet setting began to attract interest from Syrian expatriates and affluent locals (Ahmar 2018). Amid this growing appeal, Milihouse moved to expand the vaulted housing initiative. In the project's final phase — Phase

IV, launched in 1990 — the agency standardised a single prototype: a one-storey, U-shaped house known as 87_99_B_1. Built across 200 plots averaging 1,200 m² each, these houses were officially designated for Milihouse employees under a decree issued in July 1987.

But the vision had already narrowed. While the standardised model retained the basic vaulted form, its design was significantly simplified. Where earlier versions explored intersecting domes and sculptural variations, the new prototype replaced complex geometry with flat concrete slabs in corridor areas (see **Figures 5** and **16**). The vaults themselves were no longer built with terracotta bricks — the original rationale for Milihouse's interest in vaulting — but with CMU blocks, topped with cement and a terracotta tile finish. What began as an attempt to avoid steel had now reintroduced it in ring beams, made possible by new imports from socialist and neighbouring countries in the liberalising economy of the 1990s (Haddad 2004).

By the time construction ended in 1995, 270 vaulted houses stood in Qura Al-Assad. Only 70 belonged to the experimental phases; the remaining 200 — collectively known as Al-Sharqyat — had little in common with the project's early ambitions. Initially designated for employees, many of the units were eventually sold to expatriates and brokers. Some were never occupied and fell into disrepair, while others, marked by poor construction, earned the development a reputation for low quality. At the same time, military officers with close ties to the regime appropriated many units, capitalising on Milihouse's opaque and autonomous budget to build private villas at the state's expense (Military Construction Establishment. n.d.). What had begun as an initiative for public housing became a site of privilege and informal appropriation (see **Figure 16**).

Yet this very shift marked a new chapter. It was precisely in this period that Al-Sharqyat's vaulted houses began to be visually and discursively linked to heritage, evoking nostalgia for an imagined rural past. While the vaulted housing scheme lost its material logic and experimental integrity, it gained symbolic traction. Vaults remained, not as technical solutions but as aesthetic markers of identity and cultural continuity. The built forms, stripped of their initial intent, took on new meaning, shaped by class, memory, and representation. Al-Sharqyat thus stands not only as a story of architectural compromise, but also as an archive of shifting aspirations in late 20th-century Syria.

Al-Sharqyat Today

By 2000, the vaulted houses in Al-Sharqyat became desirable primarily for their location, offering a relatively affordable option in an increasingly expensive area. This trend intensified after 2000, as more families with cars found it convenient to commute to Damascus, driving up property prices and effectively ending the affordable housing scheme.

Today, Al-Sharqyat is among the most expensive properties in Qura Al-Assad. However, the value of these homes is closely tied to the state of the deteriorating building materials, and renovations are often necessary (**Figure 17**). Reforming a house in Al-Sharqyat can add up to 30% to the purchase price (interview, Al-Asadi 2018). Renovations typically begin with redoing the plastering, replacing the cladding of the CMU block vault, which is 20 cm thick, and sealing the connection between the vault and walls to prevent water leakage during heavy rains (**Figure 18**).

Figure 17: Al-Sharqyat today. Abandoned house, as built by Milihouse in 1990s, without its mortar finishing and showing the original material of cement block. Photo by Wesam Al Asali, 2019.

Figure 18: Al-Sharqyat today. Reformed house with extensions and covered vault with terracotta tiles. Photo by Wesam Al Asali.

While the vaults prevent more storeys from being added, horizontal expansions are common. Many buyers were attracted to the large gardens, which allowed for additional construction, such as swimming pools and other amenities. Typically, the horizontal expansion begins with enclosing the courtyard by adding a flat ceiling, converting exterior space into a living room or saloon. This flat ceiling can then support an additional storey, a feature seen in many expanded homes. Further expansions often involve closing the open side of the U-shaped house or replacing one vaulted side with a two-storey addition, transforming the original design into a box-like structure (**Figure 19**).

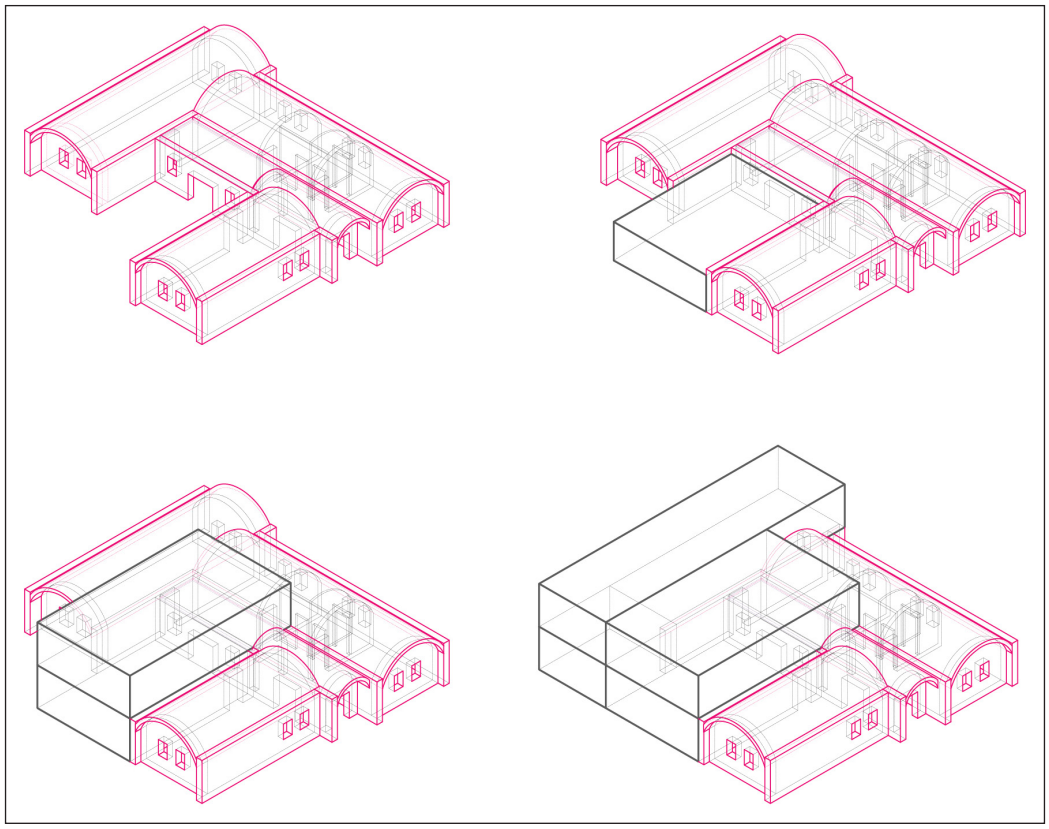

Figure 19: Al-Sharqyat today. Models of extensions and expansions, mainly made by users, of prototype 87_16_1V_1. From left to right, beginning at top: prototype 87_16_1V_1; enclosing the courtyard; vertical expansion (roofing) of the courtyard; vertical expansion (additional stories) above what was once a vaulted ceiling. Drawing by Wesam Al Asali, 2019.

In the interior, the vaults are often preserved in smaller rooms, where they can be utilised for additional floor space with mezzanines and storage (interview, Al-Asadi 2018). In many cases, the vaults are concealed with false ceilings, as their height makes the space difficult to heat or cool — ironically, a thermal issue that vaults are supposed to mitigate (interview, Al-Asadi 2018; interview, Ahmar 2018).

While most residents retain the vaults, embracing them as a defining feature of their homes, the original association with traditional rural housing has shifted. Initially designed as a cost-effective housing solution, the vaults that once symbolised innovation and practicality have now become part of a mere luxurious aesthetic for homes with swimming pools and large gardens, serve as luxurious retreats from the capital (interview, Al-Asadi 2018). As Al-Sharqyat continues to attract wealthier inhabitants, the original intent of providing affordable vaulted housing fades farther into the past, replaced by a market-driven demand for expansive, high-end properties. This evolution reflects broader changes in the region, where economic factors and lifestyle preferences increasingly dictate the architectural landscape.

Conclusion: From Architects to Builders

> The strength of the project resides, not in a nostalgic return to the past, but in the economic realities of the region. It is, actually, a living proof of the importance of our architectural past heritage. (Abed 1988: 37)

The Al-Sharqyat project highlights a pivotal moment in the evolution of architectural practice in Syria, where a dynamic relationship between tradition and modernity and between heritage and architecture is constructed. The eclectic reintroduction of elements from traditional construction, such as vaults and arches, marked a new relationship between the old and new, and between the rural and the urban. This relationship has pushed the project to innovative exploration in its early forms, captured by Abed's words: 'Traditional building techniques were not adopted blindly … In return a whole spectrum of varieties of techniques have been introduced onto the site, on different houses, adapting to different economic and labour constraints' (1988: 42).

That said, and as vaults were not common in traditional Syrian vernacular houses, the assertion that they were drawn from 'local architecture' to restore the area's 'architectural identity' proved to be more of a cliché than reality. Instead, vaults emerged as a modern, abstract, and marketable image of rural architecture — defined by curved ceilings and expansive gardens. In Al-Sharqyat, this new vernacular language was used to rapidly shift the discourse between the extremes of affordability and luxury.

The difficulty of executing vaults at a mass scale reveals a gap between labour and design intentions. Traditionally, vaults in this region have been a structural component that depends heavily on hands-on experience and craftsmanship. However, since the mid-20th century, architectural education and practice have shifted entirely towards engineering principles and material science, leading to a significant decline in the use of and interest in traditional structural elements across the region. This was explicit in Khayat's experience:

> In the first prototype we built, there were no buttresses, and there was no awareness [about this] among the structural engineers in the office. So the first unit collapsed — there was lateral thrust. That's when [external] engineers … advised us to use buttresses for the vaults. Of course, these [buttresses] weren't initially part of my design — the decision came during construction. (interview, Khayat 2018)

The reintroduction of the vault in the project at Dimas necessitated revisiting the very nature of architecture practice vis-à-vis building craft and technology. The initial success of the designs in the Al-Sharqyat project was closely tied to the direct relationship between the architect and the builder, a dynamic and intertwined connection. Contemporary accounts from that period highlight the significant role played by several builders in the project. At Al-Hamadanya in Aleppo, another Milihouse vaulted housing experiment was happening at the same time as Al-Sharqyat. Mousally mentions that one superintendent for the Al-Hamadanya project, Moustafa Al-Abdalla, replicated and improved the vaulted designs from Milihouse in the construction of the house of his brother (Mousally 1988: 98).

This collaboration between craftsman-builder and designer was essential for the success of this architectural approach. Milihouse's initiative to support architects in building and experimenting with their own homes greatly contributed to the development of a model vaulted house. A similar dynamic can be seen in the early work of Fathy. After Fathy's first vault collapsed, he headed to Aswan in the south of Egypt to encounter masters of vaulting construction. These masters subsequently played an essential role in realising Fathy's later vaulted projects (Fathy 2010: 1–10).

However, this collaborative spirit was notably absent when Milihouse decided to standardise the vaulted housing and construct 200 homes in the region. The resulting houses were of lower quality, with a simplified design that deviated from the original model. Milihouse replaced the fired brick with cement blocks, reducing the vault to a mere stylistic feature rather than a meaningful alternative to reinforced concrete (**Figure 20**).

The Al-Sharqyat project raises questions about the ability of large governmental entities to manage construction that heavily relies on specific on-site conditions. This brings us to the unique case of Milihouse under the leadership of Khalil Bahloul. Despite the limited studies on Milihouse architecture since its establishment, contemporary accounts from those who worked within the institution reveal how Milihouse's management was able to bypass the centralised control of the Syrian state in the 1980s. Milihouse became capable of independently making decisions regarding material production, contracts, and construction projects, positioning itself as one of the leading

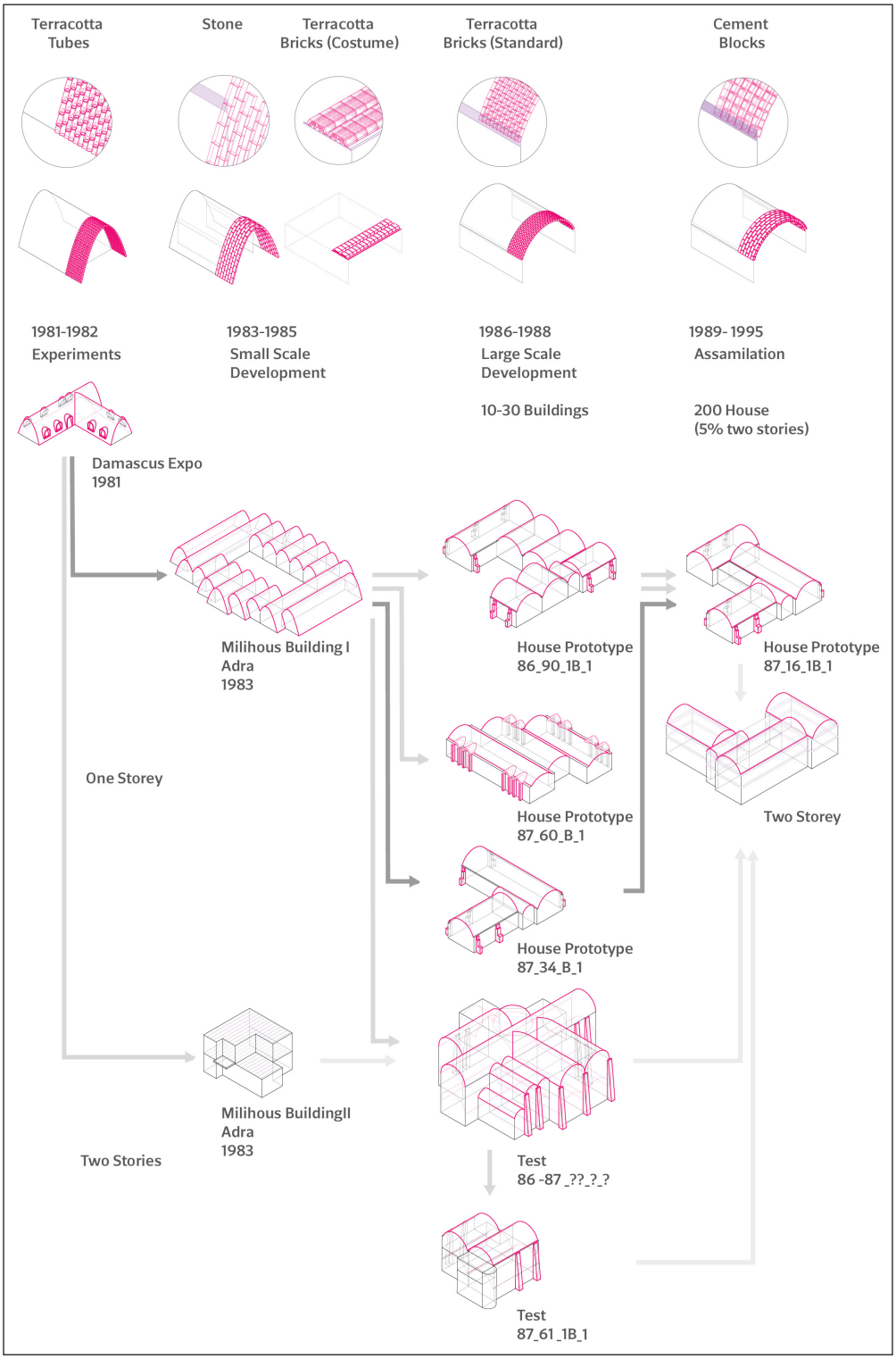

Figure 20: A visual timeline of vault experiments in Syria between 1980 and 1995, with a focus on the work of Milihouse and its application in Al-Sharqyat. Drawing by Wesam Al Asali, 2019.

employers in Syria during the era of the Ba'ath under economic sanctions (Military Construction Establishment. n.d.). This autonomy allowed for experimentation and a focus on vaulted housing as a local solution, coinciding with the broader emergency context of building under economic constraints. It's important to note that the period of standardising the vaulted housing in Phase IV, which resulted in lower-quality construction, occurred after Bahloul had left the management of Milihouse.

Al-Sharqyat project was part of ongoing efforts to document and analyse local architectural experiments in Syria in the past century. Modern architecture in the Arab world is often depicted as an imported concept, where local architects merely replicate the designs and ideas of Western modernism. While this perspective holds some truth, it does not fully capture the diversity of architectural endeavours across the region over the past century. Numerous individual and collective efforts have aimed to create architecture that aligns with local contexts, both in terms of materials and spatial design.

In addition to Fathy, architects such as Ramses Wissa Wassef (Egypt), and Mohamed Makiya (Iraq) have contributed to our understanding of modern architecture in the local settings of the Middle East, which Nasser Rabbat describes as 'contextual modernism' (2015: 213). However, many other important experiments followed these pioneers' work across the region (Siddiqui 2000; Labied 2022). These efforts continue to be studied, although there is a pressing need for further analysis to fully understand the architectural evolution of the region.

Acknowledgements

The authors gratefully acknowledge the support of the Arab Council for the Social Sciences, which made this research possible. They also thank Majida Malo for her valuable assistance with data collection and photography, Mirma Al Wareh for providing scans from *Al-Muhandis al-ʿArabī*, and Joelle Deeb for her contribution to the graphic work. The authors further extend their gratitude to Aladdin Al-Salti and all the professors, academics, architects, and builders who generously shared their personal archives and participated in interviews.

Competing Interests

The authors have no competing interests to declare.

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