

Syrian earthen villages: recovery of construction crafts to revive dome houses

Hala Asslan¹

¹Cultural Heritage Specialist, PHD architect, Expert member of ICOMOS-CIAV, Associate member of ICOMOS-CIVVIH, Aleppo, Syria, halaasslan2004@yahoo.fr

Topic: T4.2. Materials and intervention techniques for vernacular architecture

Abstract

Mud brick construction technique has been attested for at least 5000 years in Syria, and perpetuated in the region without discontinuity is currently experiencing a painful decline. Only a handful of master masons still have the know-how necessary to build the domes. It is therefore to be feared that, after centuries of transmission, the experience and skills of these craftsmen will disappear. These specialists knew how to build modest houses which were integrated into their environment without harming it. Although international conventions and laws confirms that heritage should never be the target of any clashes, during the conflict which has raged since 2011, Syrian heritage has been the object of significant destruction, looting, and the damage. This is very significant in historic cities and rural landscapes. Among the objects damaged the most are the domed houses. This paper discusses the basic architectural details and features of traditional construction system, as well as, current threats, the maintenance and future of the domed houses during and after the war, in addition to the role of rural women in rehabilitating and applying traditional techniques and methods. Additionally, it suggests a brief documentation and digitalizing for tangible and intangible heritage of rural communities living in domed mud houses. The paper proposes documenting and preserving by detailing the tangible heritage damaged by conflict, and giving an intensive training to the young generation on the building methods and traditional lifestyles, and finally recovery and maintenance of construction crafts.

Keywords: earthen villages; vernacular architecture; recovery endangered heritage; Syria.

1. Introduction

The use of mud in construction, which has been widespread for thousands of years in my country, Syria, has been facing the threat of extinction for decades. This poses a threat to a part of the memory and identity of a society that is deeply rooted in history. In the second decade of the third millennium, the Syrian mud architecture is facing the danger of extinction after it was the dominant architectural model. This is due to three main types of threats :

The first threat lies in the social changes that took place before the outbreak of the Syrian war in 2011. Moreover, it is a result of the negative impact of globalization and modernity that struck all societies. This created fundamental identity crises that manifested in the lack of appreciation of the people living in this style of construction, as they don't recognize the aesthetic, climatic and environmental characteristics of these constructions. They feel ashamed because they live in such houses. This is mainly due to the association between mud houses and poverty. It is also their desire to

adopt concrete modernity, which is viewed as a symbol of success and social and material prosperity, that contributes to these feelings.

The second type of threat is the direct consequences of the war on the local community, mainly immigration that took place due to lack of safety.

The third type of threat has to do with the continuation of the war. A large proportion of men left the country to find work elsewhere. They often work as construction workers in neighboring countries. There they are introduced to different concepts of skyscraper housing, glass, aluminum... This will change their relationship with their traditional homes, leaving them dissatisfied with their old way of life. This threatens the tangible and intangible heritage of local architecture. The traditional building rituals are usually passed down through the generations: from grandparents to sons and grandsons and so on. But due to war and displacement, young adults who have come of age are left without any personal knowledge or experience with traditional architecture. This constitutes a major crack and challenge in the chain of transmission of traditional knowledge. To face these challenges, we need to conduct accurate documentation of the architecture and construction vocabulary of this style. This should follow three stages; the doomed houses before, during, and after the war. Then we need to contemplate the following how to reuse the mud architecture in its environment, and to evaluate its positive and negative aspects. Therefore, we decided to provide a full explanation of the building style and types of dome houses to pinpoint the architectural vocabulary of this common building style.

1.1. Types of domed houses

Domed houses vary in size and shape. Some domes start from the bottom of the ground while others rise to 40 cm from the ground, or reach the height of the door. Some of these domes are complete while others stop at half the height. It is often built of mud, and there are rare domes made of stones covered with soil. Rooms were added to the houses little by little according to

the needs of the family. Usually, the dwelling or farm consists of several domes according to the family's capabilities (the minimum is a room, a kitchen and a barn). The well-to-do families, however, have additional rooms to receive visitors, a kitchen, stables, and many barns and warehouses. The number of domes often ranges between 5-8, and these are called hanging domes.

1.2. Architectural mud elements: the base, the walls and the domes

Each building has a stone base known as the "foundation"; its thickness is between 60-70 cm, its height varies according to the nature of the neighboring land and the number of stones that can be found there. In places rich in stones, the foundation can reach up to the height of the door. In this case, the wall matches it. In contrast, in areas where stones are scarce, the foundation rises slightly from the ground. But in the most common case, the builder makes two "stacks", that reach a height of 40-45 cm, and then a wall is built on them less thicker. In some rare cases, the dome starts from ground level.

When the base of the dome is square, the builder places, in the form of a triangle, in the four corners of the structure, stones called "the jarniya" or "the fox" or "the corner" and fixed bricks on them. Concerning the quality and size of the stones: we may find rubbles that are carved to a point, and others that are finely polished.

The construction of the dome is a delicate and difficult work that requires extensive professional skill and experience. The height of the dome ranges between four and a half and seven meters. In order to raise it upwards, the builder creates a transitional piece between the square of the wall and the circle of the dome. In Syria, there are two common methods of construction: the older one is based on laying a brick diagonally facing the corner of the walls. In each course, the builder arranges the bricks in

the corners in the same way so that they form a circle. A spherical triangle is also laid, which forms the transitional part until the roundness. After that, the building of the courses for the dome begins.

The second method, however, involves placing a piece of wood in the direction of abutments of approximately 80 cm in length, at each corner. Thus, the base becomes a square in an octagonal shape, from which the builder starts to make the circle. In building methods, the sequence of steps is the same. In each cycle, the building advances 5 cm until the dome narrows and takes an oval shape. This architecture is based on the principle of an extrusion that does not require an arc wrench. To the south of Aleppo towards Hama, domes have a distinctive character. The builder regularly inserts large stones visible to the outside, and they are called “dawasa” for they form a staircase that allows the inhabitant to reach the top of the dome when they want to paint it. This also facilitates maintenance work.

2. Basic design of domed houses

There are few differences in design which distinguish the houses of these areas. The most obvious difference is the concept of the courtyard. According to this arrangement, all rooms face the courtyard. Thus, the only way to enter the rooms is to pass through the courtyard. This shows that the fulcrum in the construction of rural houses stems from the concept of open space, which perhaps could be traced to the Bedouin.

All doors and some rare and small openings overlook the courtyard. Since the dominant wind bringing fresh air in summer comes from the Mediterranean, the windows are opened in the main places of residence, i.e. in the western wall. This indicates a big difference if compared to city houses with courtyards with their windows directed inward to block the view of passersby. It also cools the room with its light rays in winter, and because of the rain and the cold air that blows from the north, from the Taurus Mountains, this part of the farm has no doors and windows.

The central hall features one or two domes (double dome). This division, along with the way the house was used, shows that daily activities were moved from the courtyard, where they usually took place, to the main hall under the shades. The idea of domed houses with a central hall is seen in the old houses; of the kind that we find more in the north, in the vicinity of Ain al-Arab. Contrary to the design that allows access to the different rooms through the courtyard or the central hall, the rooms are placed one after the other or adjacent to each other, separated by doors. This would form a maze. We find the salon and the kitchen close to the entrance door while the storage rooms and stables are located in the back of the house. This design dates back to the era when thefts were very common. Using the space in this way saved the residents' modest belongings.

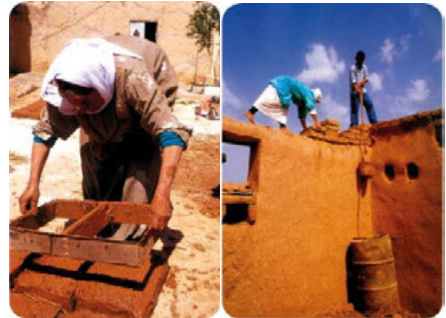


Fig. 1. Women and men build and maintain mud dome houses (Source: Kassatly, 2011).



Fig.2. Al-Jub/ Beer- Well (Source: Kassatly, 2011).

The mud is known by other names such as “cheese” or “jableh”, which is a metaphor for dirt mixed with water, sand and gravel with straw and hair. The type of clay used varies

between simple, thin or cooked depending on the element we want to build. Simple mud is used to build:

- External Warehouses, "The Hut/ Huts".
- The chicken house, "Al-Qun/Qunun".
- The stable/ stables, which is also called according to its size (hut/huts). And (Yakhour/Yoakhir), and (Habusa/Hawabes).

*Al-Jub/ Gibb or Beer/ Abyar.

- The deck/Dakk- Aliyah/ Aliyat/(attics)Branda/ Bermdat (balconies).
- basins. • Burj Al-Hamam (pigeon towers).
- The hearth/ stoves. • Tannour.
- baking oven/ baking ovens.

This type of mud is mainly made of dirt, which is sifted if necessary to remove large stones from it. Then water and hay are added to it. And women trample the mixture with their feet until it becomes soft.

Thin slime is used to build:

- Al-Kwara. • shelf/ shelves
- Kwara Al-Nahel(for bees).To make this kind of slime, the responsible woman takes clay soil and uses fine sieve to remove stones and pebbles from the clay. Then water is added to it along with finely chopped hay and fine sand to act as a detergent. And after she trampled it with her feet, she bakes it with her hands. Then she adds goat hair or some other kind of yarn.The dough resulting from the process is called "kneading" and must be assembled for two hours daily over a period of three days to become stretchable (unbreakable)and usable. Cooked slime is used in hard and highly resistant materials. We use it in the following industries :

- mound(khawabi)
- Stoves of bread ovens "Tannoor" and "Taboon" • Sometimes bees' bowls.

In order to prepare this kind of mud, women gather straw, manure and other fuels and place them inside and around the beehives or the stove. Then they light the fire regularly over a period of two days.

2.1. Mud brick fabrication

Earthen mud is used to build domed houses. It is known in Kurdish as "kerbij." This mud- brick consists of mud and wheat straw mixed with

water. The choice of this type of construction is due to the lack of wood and stones in the vicinity of the domed houses, which forced the residents to use soil as a basic building material. In earlier times, a family that wanted to build a new house would make it during the summer. This gives it enough time to dry so that the construction can be completed with its roof before winter and rainy season. After finding the place where the clay is of good quality, the landowner is asked permission to extract the soil. It is then transported by a cart and plastic containers to the area near where the mixture will be made in order to avoid transporting it manually as it might smash. In the past, the inhabitants used a basket of gum "Kufa" and carried water in jars on their heads or on the backs of donkeys.

If the dry clay contains lumps or pebbles, it is first passed through a large vertical sieve. Then a crater is dug in that heap, into which water and straw are gradually poured. One man treads on this mixture to mix it well and stirs it repeatedly to ensure that the result is satisfactory. This mixture is usually prepared the night before the work day. This dough must be left overnight to ferment and become usable. It takes 12 to 15 hours to melt the lumps otherwise the milk would remain fragile and filled with air bubbles, which makes it weak and fragile.

To make mudbrick, residents use a wooden block that they install themselves or borrow from neighbors who may own it. They often use a double-mould "nut mold", which allows two blocks to be produced at the same time. The dimensions of the molds, as well as the mudbrick, differ from one builder to another. And they also differ according to the way they are used. For the construction of walls, for example, it is possible to use molds that produce bricks with a length of 20 cm and a thickness of 10 cm. There are other molds that give mudbrick 50 cm long, 25 cm wide and 10 cm thick.

As for the dome, which is smaller, the brick is made with a length of 20 cm, a width of 25 cm, and a thickness of 8 cm, for several reasons. The

most important of which is its small size, which facilitates the process of rotating the dome, and because it is lighter and reduces the possibility of collapse of the dome.



Fig. 3. Types of vernacular architecture and Dome houses in Northern Syria (Source: Kassatly, 2011).

On the morning of the work day, the mold is moistened and taken to the designated place. The builder pours the mixture directly from the cart into the mould, then smooths its surface by hand to remove any roughness, so the brick is flat and well-adjusted. Then the mold is quickly peeled off. Then the mudbrick is ready and the mold is ready for further preparation. Hundreds of mudbricks can be made in one day. When all the relatives and neighbors cooperate in the construction, the work becomes fast. Then the mudbricks are left under the sun to dry. A place is chosen close to the dwellings or to the land where the new house will be built in order to reduce the cost of transportation. After two days, it is placed vertically and within a week it is completely dry and usable.

The builder prepares the mixture that he will use as a "mortar" to bind the mud, and it is made of the same materials. Only then can work begin. Mostly, the walls of domed houses are 60 cm thick, and they need to be made of one and a half bricks. After setting a certain height, the builder is forced to crouch on the wall and then on the dome to continue his work. At the end of the construction process with the bricks, the process of painting the house from the outside and inside is done with "tal" which is a mixture of dirt and barley straw, softer than wheat straw, and it must be sifted before use. In the past, it was manual work, but nowadays a shovel is used. After the painting is finished, a family member puts his handprint on the door.

2.2 Domed house maintenance

Domed homes need to be maintained regularly to keep them in good condition. This begins with the painting process, as the coating is essential to seal the holes and cracks that may be caused by the passage of time, especially during winter. However, the regularity of this process and its restoration varies, according to the abundance of winter rains and the quality of the soil used. Houses painted with limestone do not require maintenance except once every three or four years while the house built in red dirt needs maintenance every year. The fabric used for the outer layer, like ordinary paint, consists of earth, barley straw, and water. The last stage is to paint the house with lime water to protect it from weather fluctuations and insects. However, in areas where chalk is not available, this stage is dispensed with, as these materials become very expensive.

The house is calcined every one or two years, after the great "clearing", which takes place after the winter rains. There is an additional one if an important event in the social life of the family occurs. Then the house shall be prepared and its doors shall be properly opened to receive the guests who have come to take part in the celebration of the event. This explains that the calcination process is lived as a stage of fun and entertainment, especially for children, because it represents for them a feast that precedes joys and renewal. The house, which has been carefully calcified and cleaned, becomes a symbol of the renewal of the seasons (the transition from the dark months of winter to spring), the celebration of marriage, childbirth, and more.

In order to do this decoration, women take chalk "Howara" and crush it to make it brittle and mix it with water in order to turn it into lime water that is used to spray homes from the inside and outside. However, before that, the entire house must be emptied, so that mattresses, sofas, blankets, clothes and various tools are taken out and placed in the yard. This process also helps to purify the bedding by exposing it to the sun.

After that, the women paint the walls, within this empty space, and wipe the low places with rags, then put the ladder to reach the dome, which is often at a high altitude. And they use the bowls to throw lime water on the walls, which completely stains the women and children present. Everyone comes out polluted with white spots on their faces. The houses are left for a few hours to dry before returning the pots to them. After the work on the inside is finished, the same process is repeated on the outside. The men climb to the top of the dome. They are helped by the “dawasat” which are in the form of stone steps that are inserted into the building, and they sprinkle lime water on them. This process seems risky and it is inappropriate for women to climb to such a height on top of the dome.

It is necessary to quickly document the architectural vocabulary that is widely spread in the mud villages next to the domed houses, the most prominent of which are:

The courtyard: It springs from the concept of the open space, which is a reflection of Bedouin life. A piece of land surrounding the house is identified, where the fence is raised to separate the farm from the rest of the houses inside the village.

Wells: Wells are built in the courtyard of the house or within a public place when it is to serve a number of dwellings.

Plant ponds: Residents prepare spaces in the yard of the house or around the houses for planting various types of plants. Women sometimes make clay basins of various shapes:

Al-Qun: The majority of families in the Syrian countryside keep chickens, and to keep the chickens, women make for them a jar of clay of different dimensions and shapes.

The stable: The stable can take the form of a house with domes, but its shape is often like a rectangular building, sometimes without a roof. And if the livestock is abundant, it is necessary to make holes in the walls to secure ventilation. As a result of these numerous

holes, visible from afar, the stables are distinguished from the houses. The abandoned houses are often converted into stables.

Pigeon towers: In farms, nests are made as clay boxes with an opening of approximately 20 x 20 cm and a maximum depth of 30cm. The number of nests varies according to the houses, but in general it does not exceed a dozen

The ghee container: “Al-Wawi” is a metaphor for a clay pot made by women. It has the shape of an expanding cube raised by legs from the ground. It is placed in a dark place in the house, where it is used to store fat, which should be protected from moisture.

Kitchen: Meals are prepared in the kitchen, which is a small hall that contains only a portable stove and a semi-table on which the pots used in the kitchen are placed.

Kawer: The small earthen silos located inside the house. They are made by women and used to store grain, flour, salt, and bulgur.

The house from the inside: Because of the asceticism that residents live, there are no signs of a comfortable life. The house has nothing but the basic necessities of daily life in addition to some decorative items. Hanging on the walls are textiles embroidered by women and carrying various drawings, some of which are plant and animal, and constitute an important part of the immaterial heritage of these societies.



Fig. 4. A person who works with a mason ‘memarje’ or ‘muallem’, sometimes making adobe (Source: Lotti, 2009).

In the thirties of the twentieth century, Rich had indicated that the population neglected decoration and did not pay attention to it in general as it lost its significance because it is old-fashioned and is no longer popular. In these conditions, it was difficult, after many years, to resist the trend of modernization. The research of "Rich" and "Tomen" was conducted nearly a hundred years. These ornaments are absent since then and the women who made this art and guaranteed its authenticity are also gone. Even if we can recover it from oblivion, there is a fear that we will not be able to know all the components of this rustic art. Even the residents living there even before the war- were not able to give any information about these decorations.

3. Features of Dome houses in northern Syria

In the past, domed houses were the typical residential building in northern Syria, until the end of the 19th century and the beginning of the 20th century. It represented the rural world on the outskirts of the city of Aleppo, but before the Syrian war, its residents had left it and turned into warehouses and warehouses. In 2022, most of them turned into deserted villages.

These mud villages, whose architectural style extends for thousands of years, and are part of the Syrian identity, were not once a museum. They are a way of life, a lived life and not a festival or a temporary show, because of the characteristics of the mud houses, especially those spread in the north of Syria, the most important of which are: The temperature is moderate all year round, warm in winter and pleasantly cool in summer. The air humidity in it is stable and healthy, regardless of its ratio outside. Plus the construction mechanism is simple and the average person can, with a little practice, build it themselves with some help. The main advantage is that the main building material is free or almost free, reusable even after hundreds of years, and has unlimited possibilities in terms of shaping. The house is considered harmonious and harmonious with its

surroundings, and stands steadfast in the face of nature's factors such as rain, snow, heat and cold, despite its "soft" and "quickness" appearance.

4. Criticisms leveled at mud houses

Negative prejudices among all classes of society, such as: "mud houses are not suitable for rainy climates, as they do not withstand water", "mud houses need constant maintenance, especially in winter", "mud houses live in which insects live", "no more than One floor of mud", "These are the houses of the poor!"

5. Dome houses future

Clay building techniques have developed tremendously in many parts of the world at the time when they were dying in our country. The many research centers concerned with the subject have come up with a wide range of solutions to traditional mud problems. Architects and engineers in all their specializations had a role in developing this type of building to be able to meet contemporary needs and requirements.

For example, the Morocco Pavilion at Expo 2020 Dubai in the "Sustainability" section was built using traditional rammed mud techniques in Morocco, a facade of 4000 m² and a height of 33 m. It will be converted into a residential building at the end of the Expo..... Which constitutes a strong message to us and to the whole world about the need to benefit from the natural environmental resources,



Fig. 5. Expo Dubai 2020 pavillon maroc (Media, 2022). "Legacies for the future, from inspiring origins to lasting progress".



Fig.6. The destruction caused by the Syrian war (Source: Asslan, 2018).

6. Conclusions

After more than a decade of the Syrian war, with the wheel of reconstruction turning slowly and in specific locations only for many considerations, which we are not going to discuss here, attention must be paid to the necessity of avoiding the mistakes of the past and avoiding the wrong policies that led to the growth of cities at the expense of the countryside and working on balanced development (City and Country, Modernism and Traditional Historical Architecture). We must work to develop this architectural model to suit the requirements of the times and lifestyle in the twenty-first century.

Working on offering concessional loans (short, mid, and long term loans) for locals to facilitate their settling back in their traditional environment. Beside, empowering women due to their vital role at all levels, with regard that they are the pillars of the rural society.

Training the young generation of the local community on the building methods and traditional lifestyles, in addition to improving their educational level.

Attracting architecture and archaeology students who are interested in earthen building through workshops and training courses to learn building techniques with earth, earth bricks, rammed earth, claying with earth and limestone (calcium carbonate clay), and others.

In Syria, we can consider the destruction caused by the war as an opportunity, an opportunity to re-read ourselves and our urban produces. In order to achieve Sustainable Development goals established by the UNDP through its 2030 plan, especially Goal No. 11 for sustainable cities and local communities.

References

- Asslan, H., (2021):« Dome Houses, Earthen Villages in Syria Legacy at Risk after the War» Conference paper entitled: “Earthen and wood vernacular heritage and climate change”, organized by four of ICOMOS scientific committees (CIAV, ISCEAH, ISCES, IIBC) under the patronage of ICOMOS Sweden and Malmo University.
- Draft ICOMOS Charter on Intangible Cultural Heritage, prepared by the ICOMOS International Committee On Intangible Cultural Heritage (ICICH).
- Earth Architecture, (30 juillet 2009). Syrian Beehive Houses.
<http://eartharchitecture.org/?cat=46>
- Giuseppe Lotti - Saverio Mecca, “Earthen Domes et Habitats, Villages of Northern Syria. An architectural tradition shared by East and West”, ISBN 978-884671XXXX, ed, ETS, 2009.
- ICOMOS World Report 2004/2005 on Monuments and Sites in Danger, THOMSON, ISBN 3-598-24243-3.
- Kassatly, H. and Puett, K. , (2011). *De Terre et de Lumière*, ISBN 978-9953-0-2020-4, AL-AYN Edition.
- Reich S. (1936)., *Études sur les Villages Araméens de l'Anti-Liban*, Documents d'Études Orientales de l'Institut Français de Damas, Tome VIII, Damascus,.
- Traditional Syrian Beehive Houses Kept Heat Out the Natural Way (2009), Karen Chernick in Cities, [Online], Available:
<https://www.greenprophet.com/2009/07/syrian-beehive-houses/>
- THOUMIN R. (1932)., *La Maison Syrienne dans la plaine hauranaise - le bassin du Barada et sur les plateaux du Qalamun.*, Librairie Ernest Leroux.
- Universal Declaration on Cultural Diversity Adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organization at its thirty-first session on 2 November 2001.