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Traditional Versus Contemporary Dwellings in a Desert Environment: The Case of Bechar, Algeria

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Traditional architecture has always demonstrated a strong relationship between the buildings and their environment, as these are designed with the climatic conditions and socio-cultural values in mind. However, multiple challenges facing traditional buildings are linked to the ability of communities to sustainably preserve them in an ever changing and very different urban fabric. At a time of great socio-economic change and technological progress, sustainability, both tangible and intangible, means preserving as much heritage as possible, would be an important factor in restoring and preserving the city's identity.

The traditional "ksour" settlements have proved their environmental and socio-cultural credentials. Given that this dwelling typology is fast disappearing and being replaced by villas and apartments using contemporary production methods and materials, this work aims to compare the two dwelling typologies with a view to test to what extent the latter ones do fulfil their environmental and socio-cultural roles and to identify what lessons, if any, can be learned from traditional settlements.

The research presented here, which was undertaken using a qualitative approach based on case study analysis, is likely to contribute to a better understanding of the design and functioning of the "ksar", which is a fast disappearing urban dwelling typology.

Keywords: traditional, dwelling, "ksar", architecture, sustainability, socio-cultural.

Introduction

In traditional societies, architecture echoed the social, economic and cultural characteristics of the society and acted as a mirror reflecting its identity. Local architectural forms and details were found and seen all over the world in buildings that were the most wonderful outcome of combining people's imagination and land availability in a way that reflected local specificities (Fathy, 1966).

Traditional architecture is, primarily, about addressing the needs and aspirations of the community using the available skills and local resources. Despite the lack of its coverage in a globalised world, compared to the slick, cloud-reaching contemporary "signature architecture" that fills the page spreads of architectural magazines, this type of architecture is still relevant in many parts of the world. As recently as the third quarter of the last century, traditional architecture represented two-thirds of the world's construction activities (Rapoport, 1972). Often described as spontaneous, primitive, and indigenous, it is the product of a community or a social group's initiative and a reflection of their way of life and social values. It is rooted in its physical context through the use of local construction materials in a way that takes into consideration climatic and topographic conditions while responding to the socio-cultural needs of the community. Traditional settlements in the arid regions of Algeria have demonstrated, with their better-quality character and environmental awareness, that they can achieve both environmental and cultural sustainability (Momtaz and Feisal, 2012, cited by Diafat et al., 2019).

Notwithstanding these symptomatic features, traditional settlements are quickly abandoned. The lack of maintenance is making their poor and perishable materials of construction prone to rapid erosion and disappearance. This explains the changes in cities in the late 60s when vernacular neighbourhood disappeared while large social housing projects proliferated instead, let alone the renovation of urban centres and city expansion.

While the advances in technical ability and the changes in the socio-cultural values of contemporary societies mean a no return to traditional or vernacular architecture, we can learn a lesson from the approach of the builders who believed in the interdependence of the human being, buildings, and physical environment (Helena, 1998).

Such a lesson is particularly pertinent to the Arab/Islamic world as Bougdah (2016) puts it: "[t]here is a perception among the younger generation in the Arab/Islamic world – and most developing countries – that building in a traditional way is backward. One cannot deny that lifestyles change and with them architecture can and must change and the reproduction of tradition will not solve the problem. For these reasons, the need to understand heritage, learn the lessons from it with a view to adopt certain principles and adapt them within a contemporary context is most critical." Thus, there is a need to consider what we can learn from the traditional that can serve a purpose in a contemporary context to achieve a sustainable living environment and reap its environmental, social and economic benefits. Through a case study analysis, the paper will test the impact of contemporary changes to the original dwellings on both their sustainability credentials and the environmental quality of life for their inhabitants. Through an analysis of two dwelling typologies, the traditional house from the "ksar" and a typical contemporary family dwelling, this research will look into the consequences of the introduction of contemporary design and construction methods on the spatial and physical qualities of the dwelling and to what extent these can replace those of the traditional dwelling known for its environmental performance and socio-cultural relevance.

Literature Review

According to Sayigh (2014), the work of Rapoport's book titled "L'anthropology de l'habitation" is intended for all those interested in the topic of the dwelling for the ordinary social classes. The book is an original work that demonstrates the contribution of the social science and the ethnography to explain the concept of living (to exist as a human being) by showing the complexity of the relationships which bind humans to their environment. The work refers to primitive dwellings, usually built by their occupants with basic processes and uniform patterns as those that predate the industrial indigenous dwellings that were brought about to provide the rising need for housing as a consequence of the industrial revolution.

When attempting to take from the past to create a significant form of home for the contemporary era, it becomes difficult to decide on what is relevant given the huge choice of old-style forms something that a number of researchers referred to (Bodach et al., 2014; Saljoughinejad and Rashidisharifabad, 2015; Anand et al., 2013). The general approach that Rapoport aspires to, which focuses on the concept of culture and cultural choices, leads curiously to the notion of a flexible and varying lifestyle.

In the context of Islamic culture, the design of traditional houses must take into account three principles: trust, privacy and hospitality (Susorova, 2013; Barbero-Barrera, 2014). These are mutually beneficial because they create a peaceful and safe home and provide optimal comfort. According to Islamic customs, a house is designed as a place for personal and family privacy, a modest space for religious practices and worship. Such a space is a platform for hospitality that develops and strengthens family and social relationships that contribute to the concept of mankind creating a pleasant environment built through living on earth according to the divine rules and representing god's good will on earth (Mortada, 2011; Omer, 2010). The meaning of dwelling has been studied from the point of view of different disciplines such as psychology, phenomenology, sociology, and environmental behaviour studies (Després, 1991; Moore, 2000; Mallett, 2004). Moreover, many authors have argued that a more integrative and interdisciplinary approach to the dwelling, in which physical, socio-cultural, psychological and economic dimensions are interrelated, is needed (Després, 1991; Somerville, 1997). The building and dwelling are single phenomena, the creation by the individual consciousness out of its rootedness in culture, time and place (Barbara, 2006, cited in Arslan, 2008).

Banham (1975) sees that modern homes are a set of modern appliances and services, not bound to any location and, therefore, they are essentially rootless. According to El-Kardawi, (2010), a well-known Islamic scholar, the house is the place where an individual protects himself from harsh effects of the climate and where his freedom is enjoyed away from the social restrictions and pressures. It is a place for rest for both body and mind. The same author, in his definition of home, refers to the Quranic verse "It is Allah who made your habitations homes of rest and quiet" (Quran, 16:80). According to Nassr, (1996, cited by Mortada, 2003), Islam also regards

the house as a place of expressing and strengthening family relationships.

In a world of a more and more globalised culture, architects design in a way that cultural and religious values and principles are kept away in favour of functionality and technology decisions which are favoured during planning and design. On the other hand, there is a school of thought where followers seriously think that cultural issues, materials for construction and technology are only tools needed in the process of making architecture for humanity. They believe that when designing a house, the designer has to be fully informed and well versed in issues connected to the task (physical, climatic and social) (Mohamad et al., 2011).

While this work does not intend to discuss, in details, the changes brought about into urban dwellings in post-independence Algeria, it is worth looking at the main issues relating to this topic. For a full discussion of the topic, Djermouli (2019) is the kind of work that deals with the matter in great detail. For the purpose of this work, an overview of the evolution of the Algerian urban housing sector is presented. Up until the late 1970s, the housing provision was heavily dominated by the state sector, in terms of construction, ownership and management. To start with, housing development in the years following the independence in 1962 was not a priority for almost a decade (Chaline, 1996). This is at a time when the need to replenish the destroyed housing stock, as a result of the war of independence, was estimated by some to be in the region of 100,000 units each year following the independence (Pagand et al., 2003). By the time housing production started to become a priority, it became a numbers game as the government was trying to catch up with the ever increasing demand and design as well as construction qualities gave way to hastily built concrete housing blocks that do not meet the needs of the local population; yet they were eagerly awaited and received in the absence of alternatives. Djermouli (2019, 210) describes the failures of these housing provisions in terms of lacking urban infrastructures, technically poor quality, socially and culturally irrelevant, and inadequacy of design briefs at the level of both the dwelling and the neighbourhood. The introduction of the self/privately built dwellings, as part of the deregulation of the housing sector that came in the 1990s, did not improve the situation. Deluz (2010) argues that there is a cultural problem in this sector; as

it is supposed to present diversity given that it relies on the initiative of the owners. Both Deluz (2010) and Hadjri (1997) argue that the only difference one can find is reflecting the different socio-economic strata in the society.

Methods

The research method is a qualitative one, based on a comparative analysis of casestudies of a traditional house from a "ksour" settlement and a contemporary dwelling with a view to identify the impact on the spatial and physical qualities of the dwelling and to what extent these can have an effect on both the building and its inhabitants. Through this comparative study, it is hoped to identify to what extent contemporary dwellings measure up to the sustainability credentials of the "ksour", as a form of dwelling, and the environmental quality of life for its inhabitants with a view to learn from them in the search of a more socially, culturally and environmentally suitable form of urban dwellings for the future urban dwellers of these hot arid regions.

The Case Study

Bechar is the largest province in the South West, located in the West of the Sahara. It is a part of what previously used to be the province of Saoura, where Bechar is the capital of the province; it is about 1,150 km from the capital and about 850 km north of the city of Tindouf and about 80 kilometres from the border with the Kingdom of Morocco.

The old quarter in Bechar consists of self-built traditional dwellings with no input from architects, but through the craftsmanship of master builders who produced buildings that respect the local environment and reflect the economic means of low-income people. With the improvement in economic conditions, the need to expand to accommodate a growing population and the socio-cultural changes that found their way into the contemporary society, changes were introduced to the traditional dwellings. Obvious changes include the building layout and fabric, the size of plots and streets, the introduction of new domestic technologies and the appearance of new materials for construction. In short, the current

spatial production breaks with the urban and regulatory standards destroying in its wake the feeling of intimacy and the link to the environment. The changes produced new visual elements that no longer express the relationship of the individual to the group, and the very clear hierarchical relationships of the traditional settlements lost. This also reflects the general disappearance of hierarchies in society as all buildings tend to have equal importance confirming the views of Rapoport (1972).

The "ksour", plural for "ksar", are regarded as archetypal examples of settlements as they have morphological and organizational characteristics which are specific to them (Champault, 1969). The "ksar" of Bechar, also known as "ksar of Taghda", was first built by "Berber" peasants settled in "Ouakda", who later were joined by Arab population who settled there. The presence of military forces and the need for protection attracted traders who came to settle around the fortified outpost. The construction of the railway road together with the passing of trading caravans turned Bechar into an attractive marketplace, which became the "radiant city" in the entire region and even the Southeast of Morocco. Due to the lack of written documents, it is the legends that can provide some information about the origin of the old "ksar" of Bechar. In his novel "Meriam in the palms" (Mohamed Ould Sheikh, 1936), the author gives one version of the legend of Bechar. The couriers of the surrounding areas came to the "ksar of Taghda" to collect news from traders who arrive from various parts of the region. This is how Bechar was given its name which, in Arabic, means someone bringing good news. This suggests that the region was an important post for travellers and caravans who carried the news with them. Another locally known legend, quoted in a book by Hani (2002), suggested that the name "Bechar" came from the fact that a soldier sent by a Muslim sultan to perform reconnaissance on the region during the Islamic expeditions in the region in the 9th century discovered the presence of water in a desert landscape, hence, the name was derived from the root "bchara", which means good news.

Different climates require different and adequate adaptations to satisfy the needs. Vernacular architectures that developed throughout history have many original and interesting design practices and techniques (Singh, 2009). Vernacular building construction techniques and specifications are mainly based on knowledge acquired through

Fig. 1. The location of the city of Bechar



Fig. 2. "Ksar" Bechar.



Source: Google Earth 2018.

the trial and error principle rather than conventional practices. It creates a harmony between the dwelling, inhabitants, and the environment which surrounds them, reflecting the environmental, cultural, and historical context in which they exist. The vernacular architecture of the "ksour" was able to create comfortable climate conditions indoor by applying design strategies adapted to the natural and social conditions of specific locations (Rakoto-José et al., 2009; Rana et al., 2015). The climate of Bechar and the surrounding areas is a dry and hot one, exceeding the thermal comfort during the day and night. During winter, the cold season extends from December to February; the monthly average air temperature reaches its minimum of 3.3°C in December. During the hot summer season (June to August), the same temperature climbs all the way to 39.6°C in July. The climate also shows large

seasonal swings in daily air temperatures from -5°C in the cold season and up to 46°C during the hot season. The daily amplitude remains variable and significant throughout the year, about 20 to 25°C.

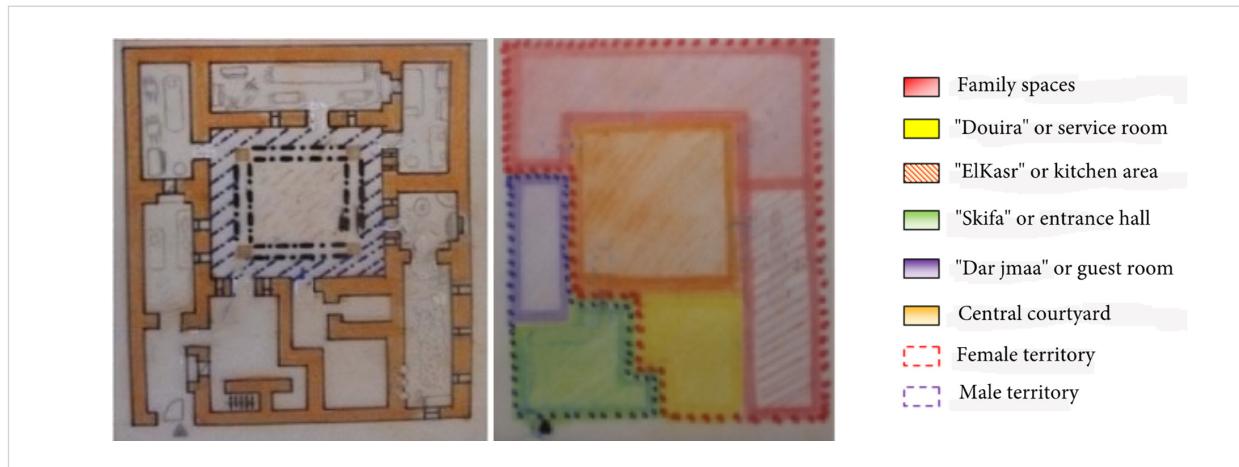
Traditional Dwellings

The internal layout of a "ksour" house is typical of traditional settlements of the region based on the central space (see Fig. 3). The "skifa", or entrance hall, is a transitional space between the street and the inside of the house as well as a filter between the inside of the house (a female space) and the guest room (a male space). This latter one, locally known as "dar jmaa" is located next to the main entrance and opens the inner courtyard right inside the house. The rooms, which are long, are arranged around the courtyard and open onto it. They tend to be closed externally apart from the presence of some high-level small openings for some of them. The central courtyard or patio traps the coolness from the air for a long time due to its enclosure, and its cooling effect depends on the width of the yard enclosure. The house usually has two or more multi-purpose rooms, depending on the size of the family and tends to be used more than just as sleeping bedrooms. The kitchen or "kanoun" is usually surrounded with three walls and can be uncovered and open for ventilation. The storage room or "el kasr" is one of the most important rooms in the home where the foodstuff is kept. It houses a special element, a feature called "khabaya", which is a cylindrical form hanging from the ceiling like caves, used for keeping the foodstuff cool. The main family room "masria" has the highest status in the traditional "ksar" dwelling; it is where the patriarchal head of the family reads the Quran.

The function of the space and the social status of its users determine its importance, but never the shape of the architectural design.

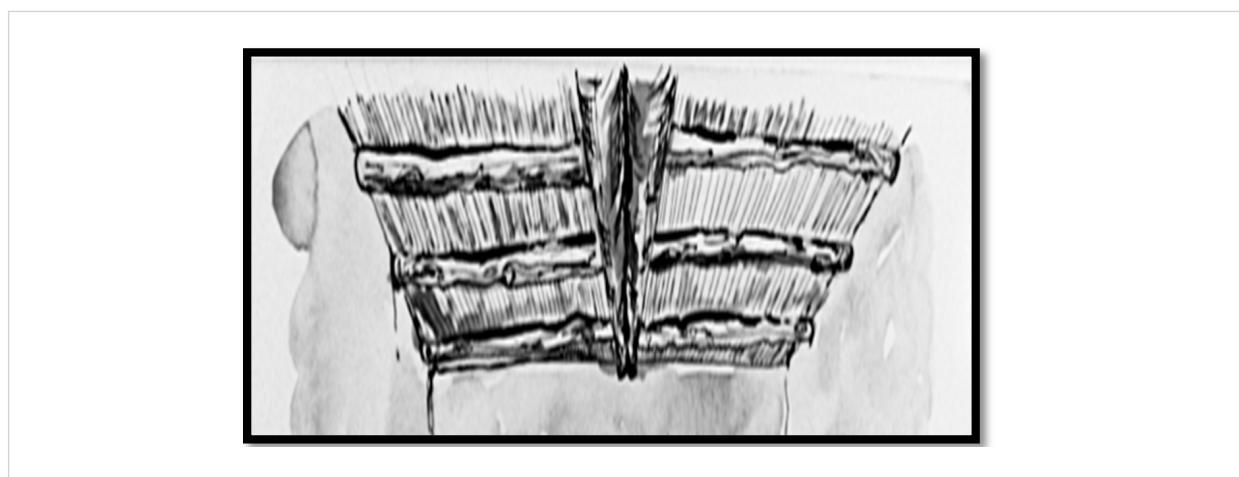
Traditional vernacular houses in this climate require specific design features such as compact urban fabrics (Fig. 5a), regular forms, optimal orientation and fenestration, massively built solid roofs with high thermal capacity materials and courtyards as microclimate modifiers. The main materials used, in this case, are sun dried clay blocks for walls with earth and palm trees sourced timber for the roof. The walls are usually 500-mm thick

Fig. 3. Floor plans of a vernacular "ksour" house.



Source: by authors.

Fig. 4. The use of timber and earth in the construction a heavy roof.



Source: by authors.

to maintain the room at comfortable temperatures, cool in summer and warm in winter, due to the effect of its thermal mass. Openings, which are located high for privacy, are usually small in size to reduce heat and solar glare (see Fig. 5c).

Traditional patio houses in the hot and dry region of Becharcan also be considered as a successful climate-responsive architecture that responds to many environmental challenges. These houses make use of passive cooling and heating strategies to provide thermal comfort for their occupants.

The passive cooling system in the traditional dwelling relies on the thermal properties of the material used, their thermal capacity and the presence of the courtyard. The thermal capacity of the air is very low; the temperature of the courtyard is also close to the temperature of its surrounding surfaces. At night, the walls and floor of the courtyard are cooled down due to radiation heat loss to the open sky. Thus, these surfaces will stay cool until the next morning. Therefore, most areas of the central courtyard have a cooler air temperature during mornings. At the same time, as the outside air temperatures start

rising due to solar radiations, their effect is prevented from reaching the inside of the rooms due to presence of the cool air in the courtyard. This is helped by the large thermal mass of the walls around the courtyard (Farzaneh et al., 2016). In the evening, the process is reversed as the heat stored in the structure needs to be released. The cool air in the courtyard helps ventilate that heat gain into the outside and keep the inside cooler. Without the presence of the courtyard, a large proportion of

that heat would stay inside the house and raise its temperature even further (Meir et al., 1995; Farzaneh et al., 2016). The rooms have flat roofs that are mainly made of palm tree branches with their leaves and a massive layer of earth. This adds to the thermal capacity of the structure and contributes to the passive cooling system as described above. Traditional wind catchers "hinia" are part of a natural cooling system while small narrow high-level openings provide natural light.

Fig. 5. Elements of sustainability in the old vernacular city "ksar" of Bechar



(a) General view: compact urban layout



(b) Fortified wall



(c) Small windows and wind catcher



(c) Narrow alleyways. Source: Ballalou (2008)

At the urban scale, the type of materials used, the size of the plots and the separation (width of alleyways) are all factors that contribute to the specific characteristics

of the settlement and the environmental performance of its dwellings. The compact urban layout contributes to self-shading and reduction of excessively high levels

of solar radiation that can cause overheating. Narrow enclosed alleyways provide shading during the hot season. From a different, but relevant, perspective, urban morphology and landscape evolution describe the relationship between society and place: the way humans inhabit space and intervene in it through the use of the various production methods in their daily lives. The link between a community and a landscape is expressed through the activities of individuals and territorial behaviour and cover a number of aspects including the type of economy and how natural resources are used, the type of regulation and the ways buildings are built, which all leave their imprints on the built environment that makes up the urban space. Agrarian and industrial societies gave birth to specific landscapes, seen as a synthesis not only of the social or economic nature of its inhabitants but also of historical and cultural foundations. Thus, strong links have been found between the perception of the landscape and many concepts associated with the idea of place identity (Cerasella and Maria, 2014, cited in Hărmănescu et al., 2016).

The Contemporary Dwellings

During the 1950s, the colonial administration introduced urban neighbourhoods, consisting of residential plots, organised in a chequered board pattern. Apart from the rigid orthogonal grid, this type of urban intervention has also introduced the garden house or villa typology for large isolated plots. These changes continued to appear after the independence and affected both at the level of the dwelling and the settlement "ksar". In the case of the former, the introduction of new Western inspired dwelling models has affected the way the dwelling is organised spatially as well as its contents in terms of furniture and fittings. They also mark a turning point in the evolution of domestic architecture with the introduction of spaces such as the hall, the corridor, the balcony, the large bay window, modern furniture and appliances such as tables, chairs, fireplace, oven, refrigerator and power supply. These changes affected all new dwelling typologies, be that the multi-occupancy apartment block type or the privately/self-built individual houses. In this study, the focus is on the latter for a direct comparison with the traditional dwellings as stated previously.

Contemporary dwellings are characterised by a compartmentalised layout without the presence of the traditional central courtyard and the multi-functional rooms (see Fig. 6). The introduction of rooms with specific functions, such as the dining room, the kitchen, the living room, the child's corner, the dining room, the TV area, and bedrooms, is a feature of contemporary dwellings. The layout consists of a distribution node (corridor and staircase) from which there is access to the various rooms of the house. Although some examples of dwellings have a courtyard, it is not central and hardly used as a climate moderator, which is the case in the traditional dwellings. The newly acquired features extend to new construction methods and materials. The use of reinforced concrete in the structural frame, concrete blocks and clay fired bricks are common. The glazed openings have increased in size compared with traditional ones. The combination of the used new materials, larger openings and little thermal consideration of the thermal performance of the building fabric have led to the use of both heating and air conditioning in an attempt to mitigate against the harshness of the climatic conditions.

The new physical and spatial characteristics of what became of the dwelling have affected the way of life for the family. The solid family unit that shared the spaces and family activities has given way to individual use of rooms

Fig.6. Layout of a contemporary dwelling



by individual members of the family for the best of times. Even when family members are in the same room, they are interacting virtually, with people outside the family unit, through social media gadgetry. The new way of life has also extended to the function of hospitality, as the clear demarcation of male only space for guests has disappeared.

Comparison between the Traditional and the Contemporary Dwellings

During the 1950s, the colonial administration introduced urban neighbourhoods, consisting of residential plots, organised in a chequered board pattern. Apart from the rigid orthogonal grid, this type of urban intervention has also introduced the garden house or villa typology, which has become the most favoured type of dwellings for the privately and self-built sector that has seen its introduction en-masse as a result of the housing sector deregulation in the 1990s. These changes have also affected the way the dwelling is organised spatially as well as its contents in terms of furniture and fittings. They also mark a turning point in the evolution of domestic architecture with the introduction of spaces such as the hall, corridor, balcony, large bay window, modern furniture and appliances, such tables, chairs, fireplace, oven, refrigerator and power supply, instead of relying on the natural ventilation system, which is fundamental in the design of old vernacular houses.

At the level of the dwelling, a direct comparison between the two typologies reveals quite few differences as shown in Table 1 below. While those differences have an impact on the physical characteristics of the dwelling and the way the space is used, their effect is also extended to the neighbourhood. In the traditional settlement, the financial contribution and the participation in the works by the neighbours are always means of asserting a sense of civic pride among the inhabitants of the "ksar" of Bechar, that confirms the existence of a certain relationship of togetherness among the inhabitants of the district during social and cultural events, such as the celebration of the prophet's birthday or the renovation of the old mosque through community funded means in the face of being neglected by the state authorities.

In the self/privately built contemporary neighbourhoods, social participation and solidarity have been

replaced by the use of paid-up contractors who have no interest in the matters of the neighbourhood beyond what they can get for their time on the building work. Table 1 below highlights the main features of the traditional and contemporary dwellings.

Discussion

The changes that occurred in the urban settlements in Bechar over the last six decades were inevitable for a number of reasons including political, demographic, economic and urban ones. Their impact has marked the individual dwellings, the neighbourhoods and the city in its entirety. In this study, however, the focus was kept on the dwelling.

The transformations introduced into the urban neighbourhood in the form of contemporary dwellings brought with them much welcomed modern commodities and services that made domestic life easier and comfortable such as contemporary furniture, fittings and rooms/spaces where specialist functions became common features of the contemporary dwellings. Contemporary servicing, such as hot and cold running water, electric appliances, air conditioning and gas heating, have brought about much needed domestic improvements. All these changes, however, did not address two major aspects of the traditional dwelling. The latter was conceived and built to be of low energy and low environmental impact due to its use of passive design strategies. The contemporary dwellings are characterised by a lower environmental performance and higher energy inputs. On the socio-cultural front, the contemporary dwellings introduced new building forms that are alien to the local culture and heritage and, more importantly, their design, production methods and ways of ownership seem to have affected the traditional ways of space usage with the dwelling (space hierarchy, demarcation of male/female spaces) and destabilised the social bonds within the neighbourhood. Some aspects of social life, such as neighbours' involvement in the running of the affairs of the neighbourhood, have all but disappeared. In traditional settlements, the neighbours participate in and run the process and the affairs of the settlement, including the cleaning of shared public spaces, building and

Table 1. Comparison between traditional and contemporary dwellings

Traditional dwelling	Contemporary dwelling
1. Location Along the river by the palm grove	Anywhere, no specific location
2. Building cluster Compact arrangement	Linear (row arrangement)
3. Rooms layout/features A. More than two rooms multi-purpose depending on the number of family members B. Storage room C. The kitchen as an open space with natural ventilation D. Entrance "skifa" leading to courtyard E. Distribution by central courtyard F. All rooms are opened to the courtyard G. Walls: stone, clay, and sand more than 300 mm thick H. Roof: flat heavy construction of palm branches and timbers, clay and straw I. External walls are covered with earth-based renders of vivid colours and textures J. Alcoves for wall decorations on internal walls	A. Individual rooms and with specific function B. Western style appliances, refrigerator and larder C. A compartmentalised kitchen with modern appliances D. Entrance hall or corridor directly in contact with the outside public space E. Hall or corridor F. Compartmentalised rooms accessed from corridor G. Walls 250–300 mm thick of concrete blocks H. Roofs made of reinforced concrete, bricks and mortar I. Glazed ceramic tiles, cement render and paint J. White plaster
4. Thermal comfort A. Built with the climate in mind, for passive strategies B. Use of thermal mass (earth, water and trees in the courtyard) C. Ventilation through wind catchers and windows towards the courtyard E. Passive heating from solar radiation on the south eastern façade F. Passive cooling by compact urban pattern providing self-shading and the use of high thermal mass in internal walls	A. Designed without due concern of local climate, inadequate position and orientation of openings B. Lack of thermal and acoustic comfort D. Air turbulences from windows on outside walls C. Mechanical heating in winter D. Mechanical cooling using air conditioning led to reducing daily temperature fluctuations
5. Social responsibility and sustainability A. Dwelling responsive to user's physical, physiological and cultural needs A. Heritage/culture inspired dwelling that promotes family bonds	B. Social dimension of sustainability weakened due to rearrangement of dwellings B. A western style dwelling introducing an alien socio-cultural model

maintenance of public facilities and celebration of social/religious occasions. These aspects of social and cultural life no longer exist and, as a result, the social bonds within the neighbourhood are reduced to people greeting each other in the street or socialising over a drink in the neighbourhood café.

While change is an inevitability and a necessity, be that to the dwelling, neighbourhood or the city, it needs to be sensitive to the context (physical, social, cultural, economic, etc.) and attempts to learn from what worked in the traditional setting and consider if any of it could be used in a contemporary reinterpretation. The urban experiments of the new "ksour" of the M'zab Valley (Bouddah and Djermouli, 2018; Daoudi et al., 2013) have clearly demonstrated that the combination of community driven and led initiatives backed by public finances to develop new models of urban settlements have yielded successful examples inspired by values from the local heritage.

Conclusion

Global production methods, new materials and services as well as global culture have been competing against traditional generators of values such as family and society. With the gradual abandonment of the traditional ideals of extended family and integration of the house into its immediate natural environment (source of the resources for the construction and servicing of the dwelling) to provide shelter from a hostile climate, the concept of dwelling is changing from the big family house to the nucleus family house or apartment.

The traditional dwelling is known for its environmental suitability and socio-cultural relevance. This is due to a number of design features. Its layout is characterised by a high level of compactness, where the rooms open onto a central courtyard. This layout makes use of

courtyard-enabled natural ventilation and the minimisation of exposed external surfaces, which contribute to the passive cooling strategy.

The other important feature of the traditional dwelling is the building envelope. The use of almost blind façade, except for the odd small openings, reduces heat gains and ensures privacy. The use of locally sourced materials is another feature of the envelope. In the case of the "ksar" of Bechar, the materials used include timber (from palm trees), natural fibres and straw, combined with earth for the construction of roofs. Adobe, clay mortar and stone are used for walls, floors and foundations. These materials provide thermal mass, much needed for the passive cooling strategy.

If traditional houses have proven their performance as a form of dwelling that managed to militate against the harshness of the local environment, preserve the cultural values of the local heritage and strengthen the social bonds between the neighbours, the same cannot be said of the contemporary houses with their poor thermal performance in a hostile climate. Furthermore, the introduction of the contemporary dwellings, without due reference to the context has produced a new form of urban dwellings that does not reflect the heritage (both tangible and intangible), which in turns affected the social bonds within the neighbourhood. This goes to show that in a hot arid climate, such as that of the Sahara, traditional construction techniques and methods (patio, narrow streets and local materials such as adobe, stone, palm, palm fibre, clay, etc.) are environmentally friendly, economically viable and socially significant and relevant. A lesson to be learned here is that it is necessary to combine some of these traditional construction practices with contemporary methods, materials and design approaches in order to minimise the excessive energy consumption in the use of air conditioning, reduce overall environmental impact and produce culturally and socially relevant dwellings.

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