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Transformation of the Saharan inhabited space in Algeria: The Case of Ksar of Bechar

Transformación del espacio habitado del Sahara en Argelia: el caso del Ksar de Bechar

Mekherbeche Youssa

Doctoral student, Department of Architecture
Laboratoire Archipel, Faculty of Technology, Tahri
Mohamed University of Bechar, Algeria
mekh.youssa@yahoo.fr

Hamouine Abdelmadjid

Professor, Department of Architecture Archipel
Laboratory, Faculty of Technology, Tahri Mohamed
University of Bechar, Algeria
ahamouine@yahoo.fr

Dib Bellkacem

Professor, Department of Architecture, Child, City
and Environment Laboratory, Faculty of Technology,
Hadj Lakhdar University of Batna, Algeria
archikassa@gmail.com

ABSTRACT/ This document attempts to reveal the transformations of the Saharan inhabited space in Algeria through the example of the old Ksar in the city of Bechar. In order to understand the evolution of this inhabited space between 1903 and 2020, we propose the adoption of the comparative approach and direct observation as methodological support. This comparison revealed the major transformations that took place in this space. As it shows, certain criteria of the practice of place are structuring and have not ceased to mark contemporary space. The results of this study are interpreted as a response to the Saharawi society's desire for change, as well as its attachment to its original practices. The article concludes that the transformation of the Ksar of Bechar is an experience that contributes to the need to integrate the cultural dimension for the success of future Saharan projects. **RESUMEN/** Este documento intenta revelar las transformaciones del espacio habitado del Sahara en Argelia a través del ejemplo del antiguo ksar (castillo) de la ciudad de Bechar. Para comprender la evolución de este espacio habitado entre 1903 y 2020, proponemos un enfoque comparativo y la observación directa como apoyo metodológico. Esta comparación reveló las transformaciones más importantes que tuvieron lugar en este espacio. Como se demuestra, ciertos criterios de la práctica del lugar son estructurales y han continuado marcando el espacio contemporáneo. Los resultados de este estudio se interpretan como respuesta al deseo de cambio de la sociedad saharawi, al igual que su apego a prácticas originales. La conclusión es que la transformación del Ksar de Bechar es una experiencia que contribuye a la necesidad de integrar la dimensión cultural para el éxito de los futuros proyectos en el Sahara.

INTRODUCTION

The need to inhabit is one of the most coveted needs of humanity since the dawn of time. This is why people have built countless types of houses in search of a small world that adapts to their needs, to their practices, but also to the environment in which they live. However, at the beginning of the 19th century, new needs emerged for many reasons, including the universalization of industrial technologies. The type of

housing that had prevailed until then was described by some as unable to meet the new needs. These prompted users to create a new type of housing in an attempt to adapt to these new needs.

In this respect, and like many vernacular settlements, the Saharan *Ksour*¹ of Algeria have undergone remarkable transformations, coinciding with the expansion and development of the city; despite all that these *Ksour* have presented

in terms of adaptation to the environmental characteristics and socio-cultural practices of its occupants.

Indeed, when we look closely at the inhabited spaces in the extensions of these *Ksour*, we can see a difference in the traditional way of living. This was revealed by a field visit to the former *ksar* specific to the city of Bechar (former name was Ksar Tagda). We also note that previous studies have revealed that the *Ksar* Tagda was

¹ Plural for "ksar", desert castle.

influenced by what the French occupation presented in the city between 1903 and 1962. After this period; this *Ksar* experienced vast extensions with which it opened up to the city contrary to its past. It also introduced an architecture different from its former counterpart.

On the basis of these preliminary data, this article attempts at revealing whether the newly built inhabited space in the extension of Ksar Tagda (now called Ksar neighborhood) reproduces the same criteria characterizing the traditional space, or whether it has really taken on new configurations. To answer this question, we propose to adopt the comparative approach and direct observation as methodological support.

OBJECTIVES OF THE STUDY

This paper aims at identifying the transformations of the newly formed inhabited space in the extension of the former Ksar (the current Ksar neighborhood), in southwest Algeria. The objective is not only to identify these transformations, but to highlight the role of the cultural dimension in the success of architecture and urban planning. This is where the importance of the present research lies.

Literature review

The research on the notion of inhabited space and the fact of inhabiting is central today in every field dealing with the question of the relationship of humans with their environment. The question is no longer the prerogative of anthropological and social sciences alone, but has become the object of geographical, architectural, and urban research. This is also true concerning interdisciplinary cooperation, to improve the development plans of the subject by expressing a scientific answer. In this context, we cite the work by Decouflé and Berquin (1976), who examined the prospective of inhabited space, one being a political scientist and the other an architect-

urban planner. Both researchers proposed a systematic reflection on inhabited space by writing a system of transformations likely to affect the essential elements of human beings' relationship to space. However, although this approach took fully into account the relationship between humans and space, it was of a profoundly anthropological and social nature and failed to specify the real horizons of habitats as a physical materiality.

For a deeper understanding of the concept's meaning, Lazri (2008) stressed that inhabited space is the space occupied by inhabitants for use and inhabited consumption; it is also a space domesticated by users. In another definition stated by Bailleul (2009), inhabited space is the space signifying habitual practices. Through these two meanings, researchers seem to agree unanimously on the fact that inhabited space is linked to the use and practice of place. Similarly, Thibault (2008) contributes to the enrichment of the concept's meaning by breaking it down into: all places of residence, all places of activity, all places of leisure, etc., and all the spaces that connect them.

Indeed, the acceptance that inhabited space is an interpretation of the relationship between human beings and their environment helps to explain the urban and architectural diversity throughout the world. It also makes knowledge of the cultural context and social practices indispensable if one is to understand the evolution or formation of any of these inhabited spaces. In this context, Norberg-Schulz (1985) links the notion of inhabitation to the rootedness of cultural and social expressions and values. He explains that humans inhabit when they succeed in orienting themselves in an environment or in identifying with it, or simply when they experience the meaning of an environment. Also, Haj-Mohamed (2017) links the action of inhabiting to ways of living experienced in a whole spatial organization elaborated with reference to socio-cultural models. Andriyanova (2013)

also linked the formation of inhabited space in the oases of Oman's inland to the four poles representing the culture of the Arab-Muslim city.

As for the Saharawi inhabitants in Algeria, previous research has provided a perception of the Saharawi ways of doing things to embody the place. In her research, Bousnina (2004) explained how the indoor of Saharawi houses are used between day and night, and also according to gender. Haj-Mohammed (2017) enriched this subject and explained that the indoor uses of this house rest on four foundations, namely hospitality, family intimacy, spatial centrality, and internal nomadism. In other research, Benmohamed (2005) and Mansouri (2018) found that the Saharawi community had developed in its past a spatial organization that reflects its social, cultural, and religious practices. But the question is whether this inhabited space, after its expansion and transformation, still reflects the same traditional structure, or whether it has adopted other levels. This is the question we are trying to answer in the present research.

STUDY SITE AND METHODOLOGY

The neighborhood of Ksar is part of the city of Bechar, located 950 km southwest of the capital Algiers (figure 1). The city covers an area of 5050 km² with a population of about 150,000 inhabitants. The neighborhood of Ksar covers an area of 31.46 Ha with a built-up occupation of 35.55 dwellings/Ha, with a population density of 282 inhabitants/Ha. The city is characterized by its arid and desert climate, with a contrasted thermal regime (chart 1) and scarce and irregular rainfall below 100 mm per year. These unfavorable characteristics are compounded by harsh sand winds during the half seasons. In fact, the neighborhood was shaped by the extension of the former Ksar Tagda. The latter was erected in a central position in relation to the natural elements that surrounded it "mountains, desert and plains" (figure 2). Today, the extension of the former

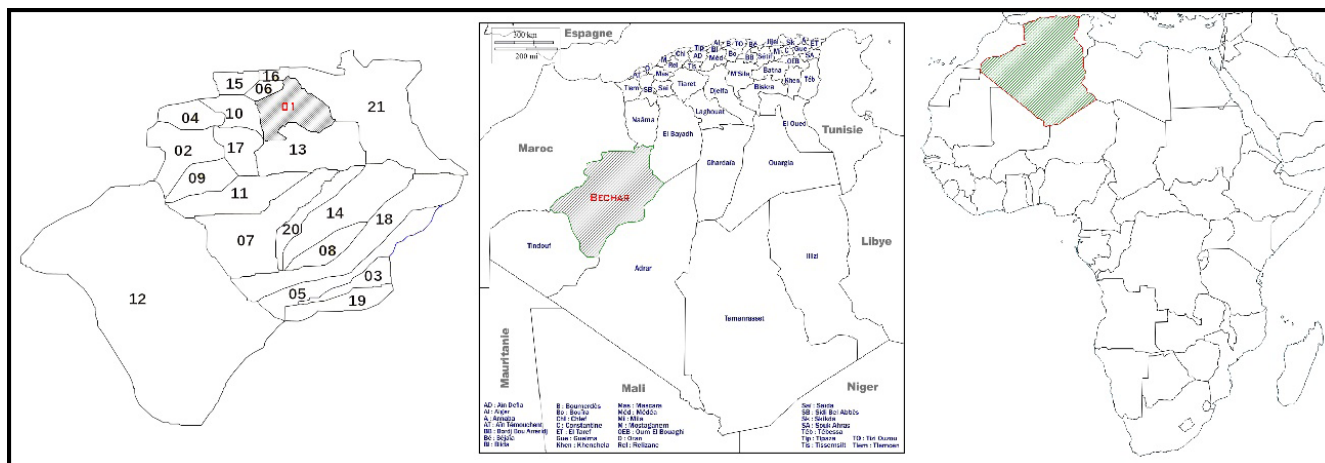


Figure 1. Situation of the city of Bechar (source: Prepared by the authors on the basis of maps of the wilaya, 2020).

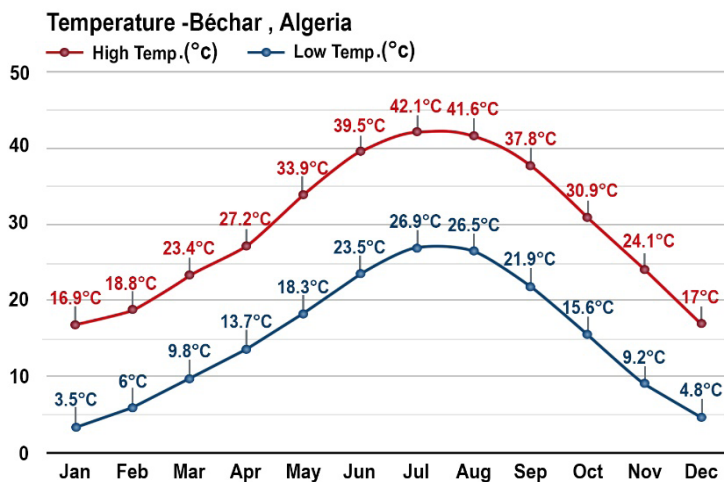


Chart 1. Average temperature at Bechar, Algeria (source: Weather-atlas, 2020).

Ksar Tagda has a non-uniform appearance: a combination of old degraded buildings and unfinished new constructions. This prompted a diachronic comparative study to apprehend the transformations that took place in the inhabited space that constituted the former core of the city of Bechar.

The comparison is based on the reading of graphic documents and photographs relating to the two chronologies that can reveal the maximum traces of transformation: the pre-colonial period and the colonial period, which describes the traditional state. Additionally, the current

period describes the state of the Ksar after the transformation. The choice of these states was dictated by a thorough reading of research on the evolution of the city (Benmohamed 2005 and Zahir 2018). The time arrow (figure 3) illustrates the evolution of the studied neighborhood over time.

In addition, the comparison is made on two scales (figure 4):

Comparison of cadastral plans and photographic reports of the Ksar between 1903 and 2020. The reading addresses structure and organization, social life, and productive activities.

These criteria were selected because the Ksar is a traditional configuration subject to a particular construction rationale of the inhabited space. This logic can be discovered with the help of the criteria developed by Viaro and Zeigler (1983) that define the elements of the traditional habitat.

Architecturally: This phase uses tools such as direct observation, architectural surveys, and archival documents to identify the typological characteristics of the

houses produced in both periods. This characterization takes place according to the founding triptych of the Solidity, Beauty, and Utility architecture stated by Vitruvius, updated according to the requirements of the time by Dehan (2016) in terms of Durability, Uses, and Forms. The Vitruvian triad is adopted in this study because it presents the most complete criterion for studying the components of all types of architecture. This is proven by its reformulation and adoption by many architectural theorists throughout the ages, including Alberti (15th century), Blondel (17th century), Durand (18-19th century), Guimard (19th century), Nervi (20th century), Dehan (2016), and others. With this formula, we wish to clarify the effectiveness of Vitruvius' triad to describe architectural quality. The fact that many researchers (some of whom have been quoted in the text) adopted this triad indicates this effectiveness. Thus, our interest as researchers in the question of architectural quality also explains why we have chosen to characterize the inhabited space of the Ksar district according to these three criteria.

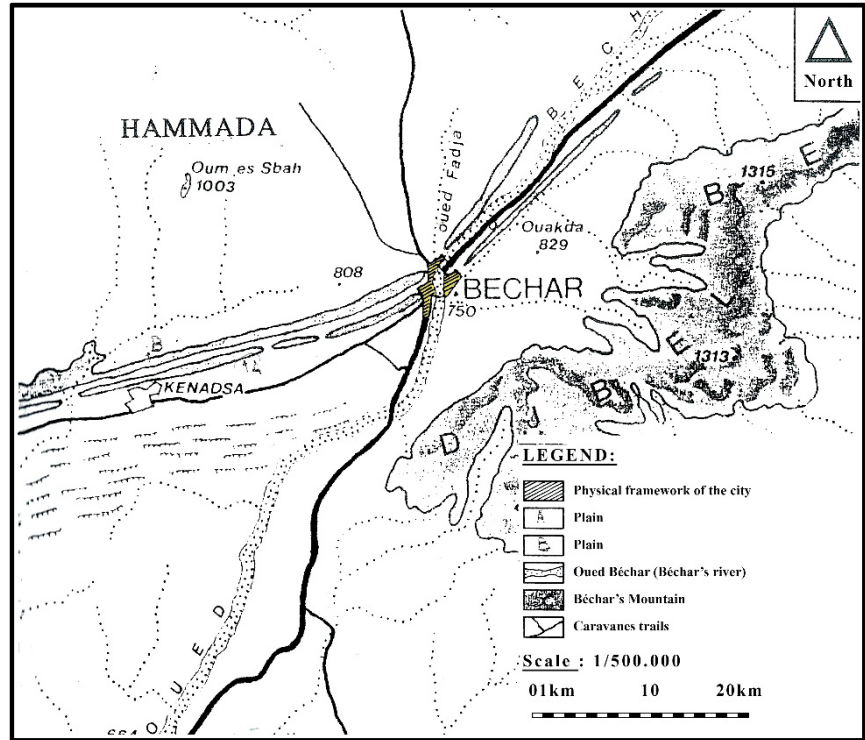


Figure 2. Geographic setting of the city of Bechar (source: Bousnina, 2004).

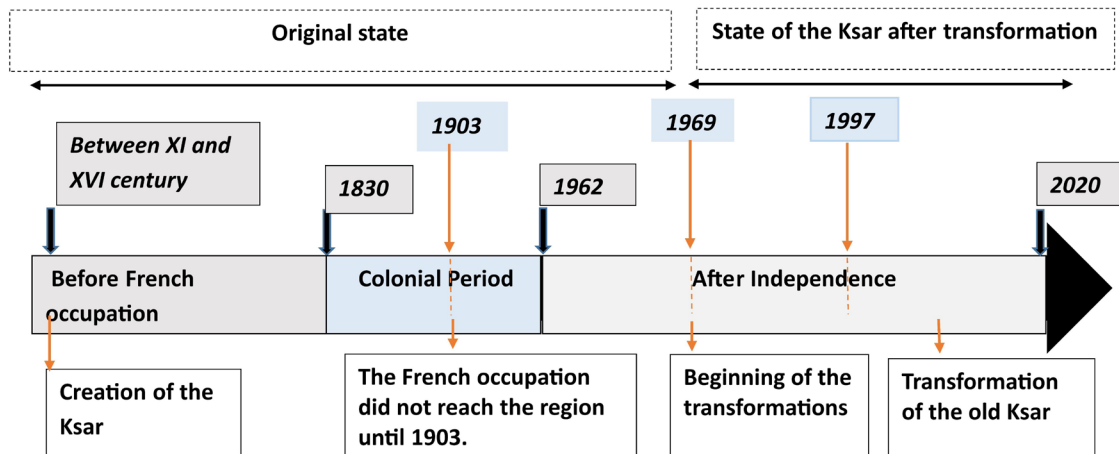


Figure 3. Evolution of the Ksar of Bechar over time (source: Prepared by the authors, 2020).

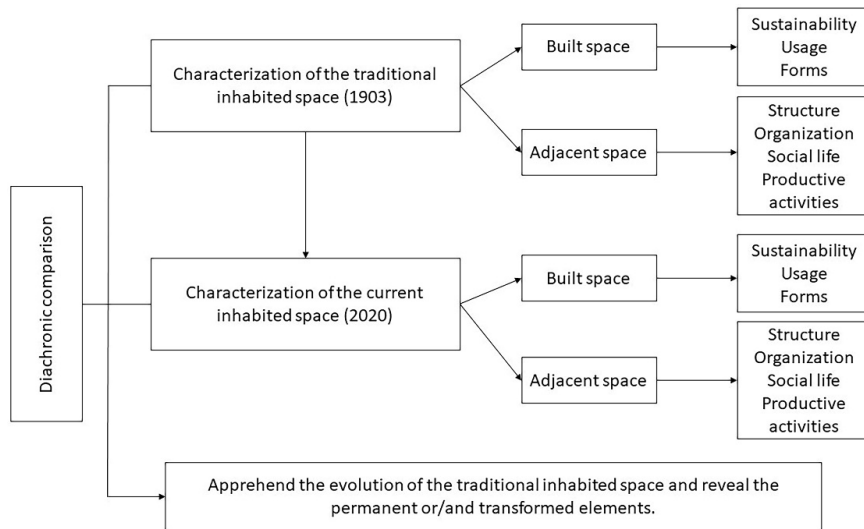


Figure 4. Scales of the diachronic comparison (source: Prepared by the authors, 2020).

THE KSAR OF BECHAR BEFORE 1903

The creation of the Ksar

Stories and legends have circulated that the source of the name of the city of Bechar goes back to the Arabic word for the person who brings the good news. The same is true for the city. As the tale goes, the Sultan of the West sent a messenger to discover the region; upon his return, he announced that there was drinking water in the region. Events followed until the tribe of Sidi Muhammad Ben Bouziane built a fortified *Ksar*, and planted palm groves and built wells nearby. In 1903, the French drew the first plan of the region, pointing to the location of the first *Ksar* in the area (figure 5).

The Ksourian occupation logic

The old *Ksar* of Tagda was distinguished by its particular logic of occupation, considering the advantages and the difficulties of the context in which it was built. An additional remarkable aspect was the nature of its inhabitants, who were connected by common traditions and

a social life associated with a collective practice. The official website of the Health and Population Directorate of the Wilaya of

Bechar² indicated that the inhabitants of the former *Ksar* were members of four families, namely Ouled d'El-Hirash, Ouled d'Al-Ayad, Ouled Uday, and Ouled Sharif.

The description of the plan of the ancient *Ksar* established in 1903 (figure 5) reveals that the logic of production of its inhabited space is based on a functional lifestyle. The plan shows the longitudinal distribution of different agricultural plots near the water source and crossed by tracks separating the *Ksar* from the banks of the wadi, while forming a farming area and palm groves. The latter assured the survival of the Ksourian occupants, representing a rigorous conception of a common life based on agriculture.

On the other hand, the organizational structure of the *Ksar* had characteristics that reflected the logical conjecture of its occupants, in an attempt to create a safe indoor environment adapted to warm climate. As shown in image 1, the *Ksar* was surrounded by ramparts, towers, and portals. The Ksourians also made the interior

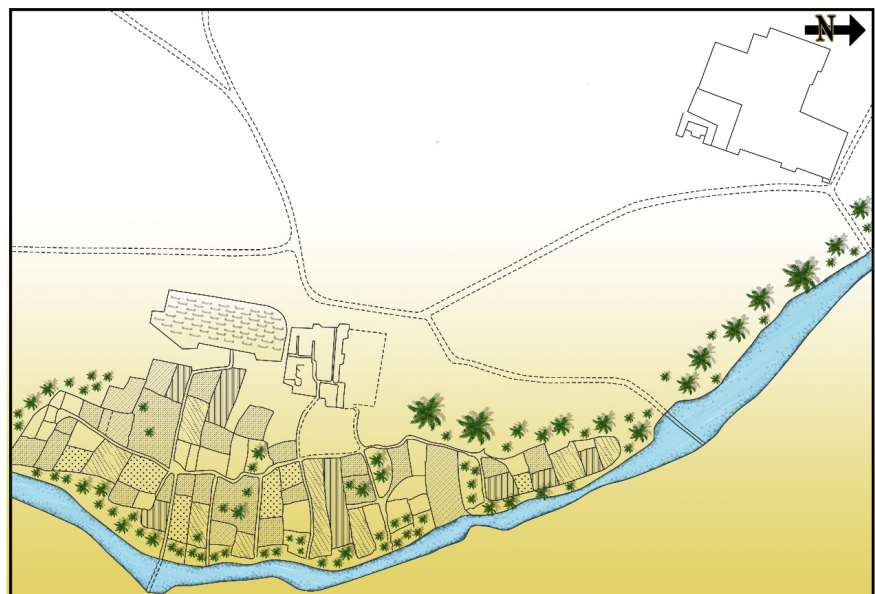


Figure 5. Plano del antiguo Ksar en 1903 (source: Based on URBAT, modified by the authors, 2020).

² <http://www.dsp-bechar.dz/> (access on 12/12/2020).

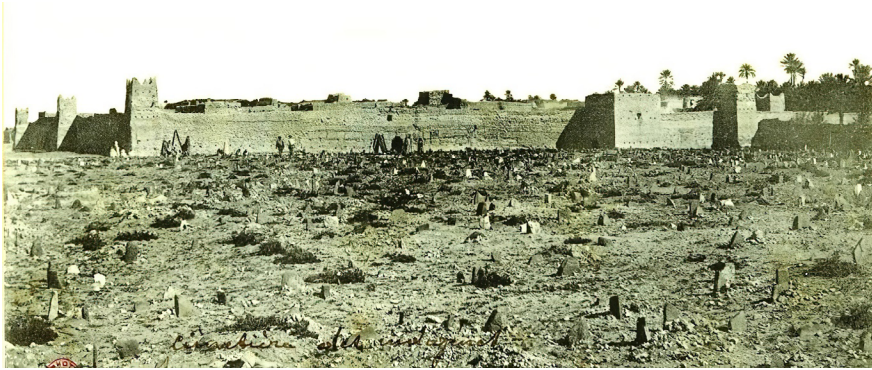


Image 1. Towers and ramparts surrounding the old Ksar (source: www.vitamedz.com/le-ksar-de-bechar/Photos_16407_17827_8_1.html, access in 2020).

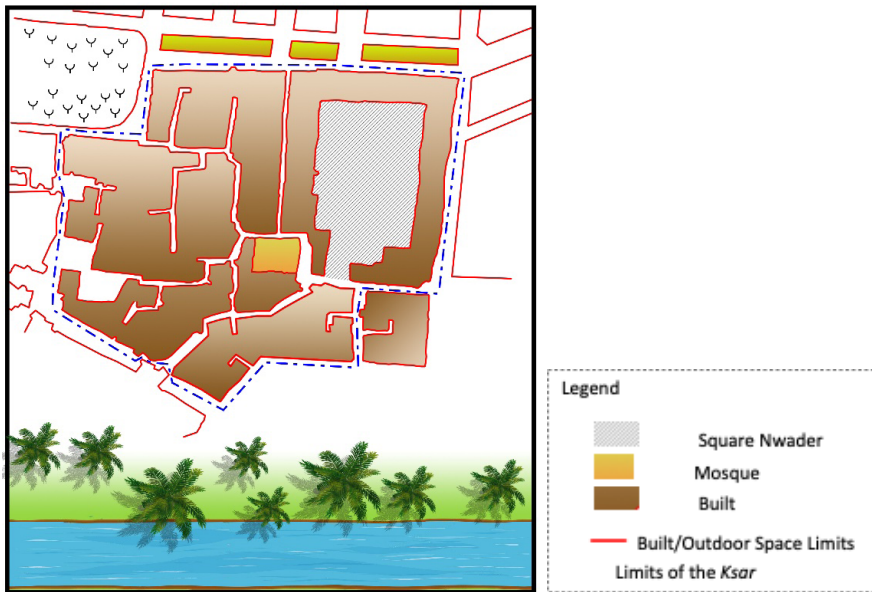


Figure 6. Illustration of the compact shape of the old Ksar (source: Based on Benmohamed 2005, prepared by the authors, 2020).

environment cooler than the exterior. This was due to the compact square structure of the general plan and to the internal hierarchical distribution in the form of narrow paths called *droub* (figure 6), also used for communication purposes among the Ksorian families.

Social life was based on common practices set by family rules and religious values. The *Ksar's* plan (figure 6) shows the location of the mosque, locally called *El-Djamaa* in front of the main entrance. This position gives the visitor an impression of Islamic hegemony, while for occupants it points

to the need to respect their being and their decisions, but also to reinforce their religious imperative. The plan also illustrates the opening of the northern facade of the *Ksar* to a large rectangular courtyard called *nwader*. This public square was formerly used for the storage of products, but also for festivals and religious celebrations aimed at reinforcing social relations and cultural exchanges.

Inside the houses, the head of the family held a dominant position. This is proven by the fact that he was in charge of the keys to the supply rooms –*El-Makhzen*–, a custom that reinforced family values and respect among its members. The fact that the southwestern region of Algeria is subject to climatic aridity aggravated by irregular rains that leave no room for food security makes it necessary to speculate on a solution to preserve supplies, which is why the Ksourians created *El-makhzen* as a safe place to store the household's farm produce.

The canonical type of the Ksourian dwelling

Almost all the dwellings part of the Ksar share certain features. Indeed, daily and seasonal temperature changes, drought, and sandstorms prompted Ksar inhabitants to build protective facilities. In addition, the topography and locally available building materials played an effective role in determining the architectural characteristics of these houses. The influence of Islamic culture and ethics in all aspects of the architecture was also evident in every detail. Ksorian architecture was based on adobe brick construction techniques, a material with many advantages in terms of thermal insulation, as proven by numerous studies (Oliva et al. 2006). The use of local materials reflects the self-sufficiency of the Ksorian occupants, given its availability close to the construction site, their know-how, and acceptance from an environmental and social point of view.



Image 2. Beams made of local materials (source: Authors', 2020).

This architecture is designed with a fairly thick load-bearing wall structure (between 35 and 40 cm). The beams are made of tree-trunks (image 2), which explains the almost common width of all the rooms of about 2.5 meters (Djeradi 2013). As for the roofs, they are made of *jrid* palm tree supports.

According to Oliva *et al.* (2006), raw earth is characterized by a high thermal inertia: 275 Wh/m² for a 35 cm wall. This property involves an important phase shift of the external thermal input, particularly interesting for hot and arid climates. Thanks to its hygroscopic properties, raw earth also has the capacity to absorb, store, and reject moisture faster than other building materials. This characteristic acts as a natural cooling and dissipation system for excess heat.

At the formal level, most of the dwellings making up the former Ksar of Bechar, present a collective work that shows

no sign of richness, but a common architectural configuration designating a shared culture of reference. House height is below two stories (R+1), which is mainly explained by the load-bearing capacity of the materials, and climate adaptation needs. In some dwellings, the stories are easily seen thanks to protruding trunk beams and window arrangements. The number of windows is limited to a maximum of one or two per house, an introverted aspect that characterizes the *ksurian* house (image 3).

Flat roofs are the dominant roof type in the Ksar of Bechar and in most the Saharan *Ksour*. The houses take on the color of the earth in a uniformity of aspect harmoniously integrated into the site of reception, one thus speaks of a typical relationship that binds humans to their land. In addition to these architectural characteristics, the juxtaposition of the houses gives the *Ksar* a compact form,

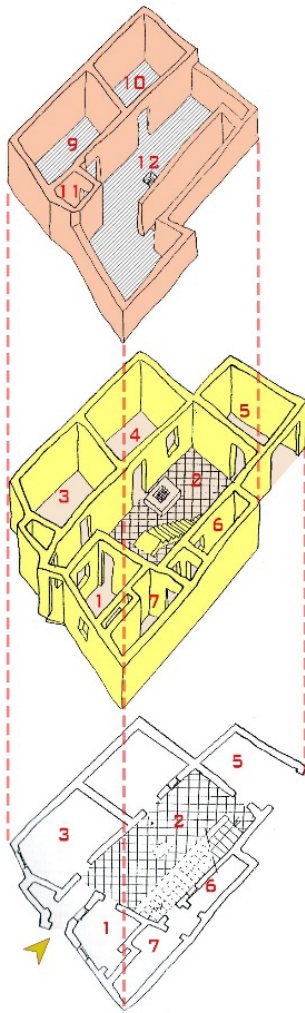
which contributes to the creation of a maximum of shadow zones.

In terms of uses, the spatial and family organization of the dwellings is quite simple; it presents polyvalent spaces of the introverted type, organized around a central space called *El-Haouche* and endowed with a zenithal opening called *Ain dar*. The living room, *Bit diaf*, is a sacred space in the house (figure 7).

Rooms are appropriated in a segregated manner. Their use varies according to gender (women/men); the nature of users (owner/foreign visitor); and time of the day and seasons (internal nomadism). This practice is explained by the need for of thermal comfort during summer nights. But it also represents a particular culture for the inhabitants of the Saharan zones. This "segregation" appropriation and "internal nomadism" reveal a poly-functionality and spatial control by Ksourian users.



Image 3. Old photo of houses in the Ksar of Bechar (source: <http://saoura.over-blog.com/>, access in 2020).



Legend of the spatial distribution:

- 1 kitchen
- 2 central space
- 3 space for visitors
- 4 bedrooms
- 5 garages
- 6 storerooms
- 7 WC
- 8 bathroom
- 9 rooms
- 10 rooms
- 11 bathroom
- 12 terrace

Figure 7. Spatial organization and shape of traditional house (source: Prepared by the authors, 2020).

THE SETTLEMENT OF THE FRENCH AND THE EXPANSION OF THE AGGLOMERATION

In 1905, the railway linking Bechar to the north of Algeria was built. This railroad has contributed to the development of the city since 1917, when the first French civil quarter was established near the *ksar*. The neighborhood then developed to form a European village, characterized by a different production logic than that of the *Ksar*: New materials and construction techniques, a grid plan, and wide tracks. The village quickly evolved to form the present town (image 4).

TRANSFORMATIONS OF THE OLD KSAR OF BECHAR

After Algeria's independence in 1962, the former *Ksar* underwent remarkable

extensions. According to Benmohamed (2005), the *Ksar* became administratively the "Ksar district" between 1962 and 1988, because of the number of houses and people that lived there.

The first transformation that draws our attention when looking at the current plan of the traditional layout (figure 8) is that most of former farmlands are now built. The blocks that make up the neighborhood are very dense and extend over large surface areas. It is therefore an extension to the detriment of agricultural land and a change in the livelihoods of the occupants. Also noticeable is road traffic within the extension, which is provided by an organic network of tree-shaped traffic lanes, wider than the one that characterizes the old nucleus.



Image 4. Aerial view of the European village built near the *Ksar* (source: Hamidi, 2011).

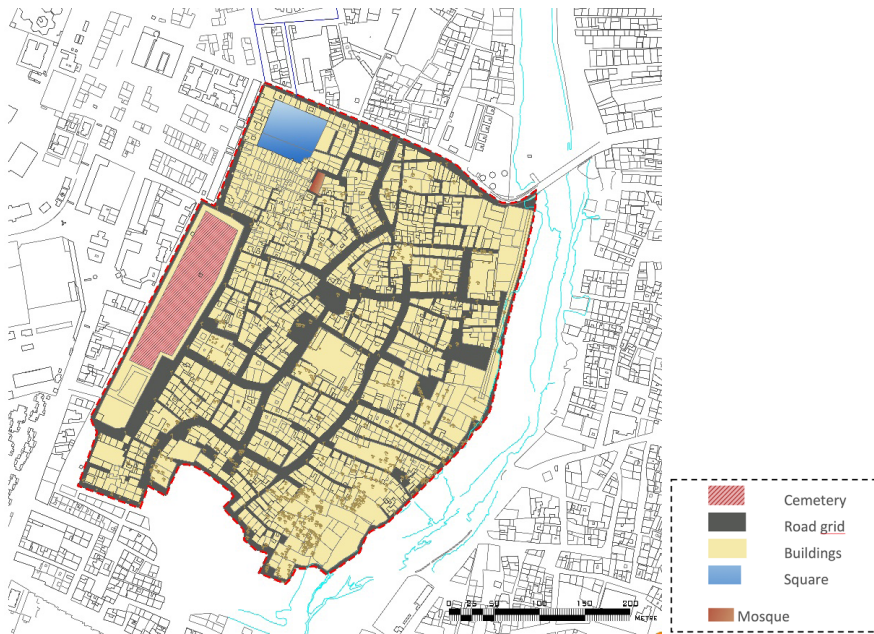


Figure 8. Cadastral plan of the study area in 2020 (source: Based on Cadastre de la Wilaya, modified by the authors, 2020).

As for the organizational structure, it is now extroverted. Direct observation has revealed that the *Ksar* has lost its defensive and introverted character because it is no longer surrounded by its walls and towers. It is also noted that the covered passageways and the old building suffer significant deterioration (images 5 and 6). However, the old mosque (image 7) has retained its position and dominance over the social life of the *Ksurians*. The *Nwader* square has also retained its location, it is currently used as a soccer field and for religious festivals such as the *Maoulid*.



Image 5. State of the passages (source: Authors', 2020).



Image 6. Vestiges of the traditional houses (source: Authors', 2020).



Image 7. The old mosque has been renovated (source: Authors', 2020).

The new house produced in the neighborhood of Ksar

The majority of the houses built between 1997 and 2020 in the Ksar neighborhood were built individually by the owners. As a result, the architectural product did not conform to a unified construction model, contrary to what the traditional product had shown (image 8). However, it was clear that all these constructions converged in one direction, namely the translation of the individual perception of modernity and the influence of what the French product offered in the region.



Image 8. The appearance of built houses (source: Authors' 2020).

All these houses take rectangular shapes following structural patterns of crossed lines. This facilitates the construction of a reinforced concrete column-and-beam construction system, as well as the floors of a hollow body slab and a concrete compression slab. The envelope is made of hollow terracotta bricks of 10 to 15 cm or concrete blocks of 20 cm thick. The external sheathing is made of cement mortar. Indeed, user-builders resort to these materials to increase the building's durability and lifespan, but also to establish design plans in a freer way in terms of dimensional unity than with the traditional plan. Indoor temperature, however, is not moderated by this use. Direct observation revealed that occupants use air conditioners (image 9) for temperature regulation in summer. This type of habitat conveys a sense of eternal construction non-completion, revealing the blocks and unpainted

bricks. Also, there is a rather clear lack of architectural know-how, sometimes imposing volumes with a vertical elasticity.

The urban facade marks a variety of heights, without any color homogeneity (images 8, 9, 10, 11).



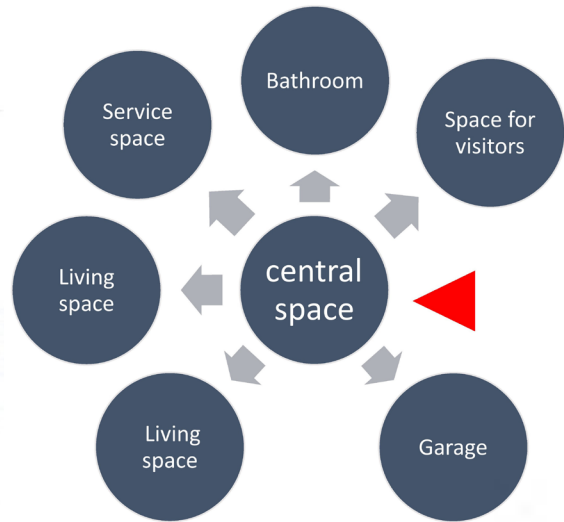
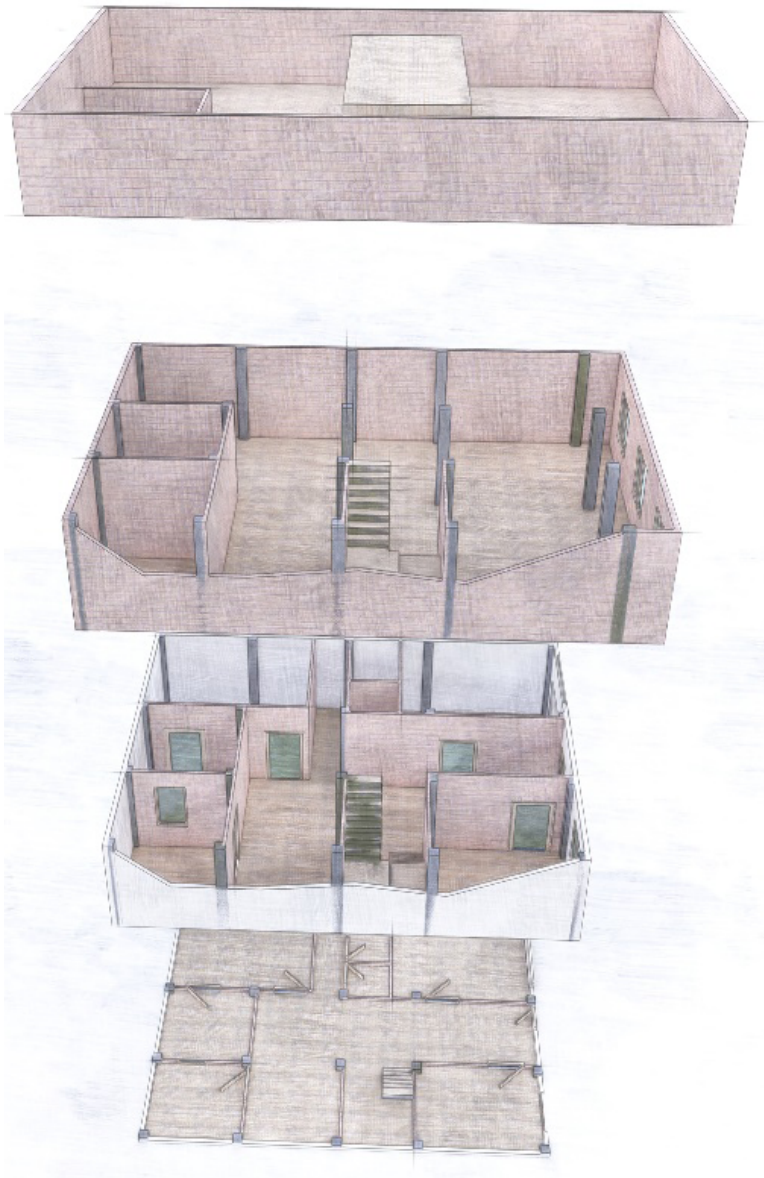
Image 9. Use of air conditioners (source: Authors' 2020).



Image 10. Unfinished large volume house (source: Authors' 2020).



Image 11. Different heights in the Ksar neighborhood (source: Authors' 2020).



At the spatial level, the analysis of new houses reveals a permanence of the traditional appropriation (figures 9, 10):

- **Spatial centrality:** A multifunctional place that brings spaces together and distributes them. It can accommodate virtually all household activities: sleeping, eating, partying, etc.
- **Hospitality:** It translates into the practice of reception and the layout of reception spaces.
- **Specific appropriation:** It is distinguished by internal nomadism and gender appropriation.
- **Intimacy:** The inhabitants always keep their intimacy by covering openings with curtains (Hadj-Mohamed, 2017).

THE SAHARAN INHABITED SPACE BETWEEN PERMANENCE AND TRANSFORMATION

Table 1 is based on the cadastral plans of 1903 and 2020 and the identification of the typological characteristics of the houses built during these two periods. The table summarizes the most important results of the comparison between the traditional and the new inhabited space.

Figure 9. Spatial distribution of a typical house (source: Prepared by the authors, 2020).

SCALES	CRITERIA	OLD KSAR (1903)	KSAR DISTRICT (2020)	COMMENTS	
NAME		Ksar Tagda	Ksar District	Change of designation due to extension	
SPATIAL OCCUPANCY LOGIC	Livelihoods	Functional and residential	Residential	Construction at the expense of farmlands	
	Structure and organization	Introversion and defensive aspect Internal hierarchical distribution Adobe architecture	Extroversion and openness to the city Network of organic tree-structured traffic lanes Vestiges of traditional buildings	The expansion has increased the structural organization of the former <i>Ksar</i> which is trying to change the course of its development by following the city's expansion	
	Social life	Asset management and collective practices Defensive character The domination of religious practice	Individual life Opening to the city Dominance of religious practice	The <i>Ksar</i> has lost its defensive character with its opening to the city The <i>Ksar</i> lost community life after the disappearance of farming	The mosque still frames the religious, social, and cultural life of the <i>Ksour</i>
CHARACTERISTICS OF THE BUILT SPACE	Sustainability	Use of local materials Know-how	Use of new materials Construction using foreign labor force	The material used in the old <i>Ksar</i> is losing its social acceptance; the needs of the society are currently oriented towards the use of new construction techniques in order to increase construction life span The house loses its climate adaptation ability	
	Forms	Simplicity Homogeneous height ratio Introverted aspect Earth color	Untreated facades Large openings No concern for aesthetics Color of unpainted brick or cinder blocks Variety of heights Large volumes	The desire for change in formal quality is very evident. The new construction takes a new direction devoid of any architectural knowledge, which leads to a feeling of disorder and visual discomfort	
	Use	Organization around a central space Segregated appropriation Reception practice Privacy	Organization around a central space Segregated appropriation Reception practice Privacy	The house preserves its structural practice, its functioning, and its use	

Table 1. Comparison of results (source: Prepared by the authors, 2020).

Table 1 shows that the transformation of the inhabited space in the Ksar of Bechar can be considered as a partial transformation. In spite of the obvious transformations that changed the logic of land occupation and livelihoods –as well as the organizational structure revealed by its defensive and introverted aspect– the former mosque still frames the religious and social life as it was before.

Likewise, the newly built spaces in turn show the permanence of the characteristics of use, contrary to the attempts to change technical and formal features. Consequently, the persistence of certain elements of the traditional configuration and the abandonment of others are interpreted through this study as a response to the desire for change, but also to the attachment to these original practices by the Saharawi society. The result is a so-

called hybrid type, which integrates both traditional and modern characteristics. However, although the latter type of construction and spatial configuration attempts to reflect the desire for change, it can lead to a conflict between the environment and the building. It can also increase the risk of dysfunction and maladjustment to the capacities and limits of the Saharan environment. This has manifested itself in the use of cooling and heating equipment by residents, unlike in the past when the building, the compact shape and the narrow winding roads provided the thermal differences between indoors and outdoors.

CONCLUSION

After the Algerian Sahara has told the story of the adaptation of its inhabited space to the harshness of its conditions, it

now presents a conflict between the past and the present, despite the evolution of construction methods. This article has clarified the characteristics of the new space created. In attempt to change, this space combines modern elements with traditional elements reflecting the attachment of the Saharan inhabitants to their past. These results suggest that the transformation of the Ksar of Bechar is an experience that supports the need for stronger policies that frame the development of traditional spaces, based on the reinterpretation of traditional criteria within the framework of technical innovations, in order to create quality inhabited spaces. ▲■■■

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