

Architectural Production in The Saharan Establishment Between Yesterday And Today- The Case Of Bechar City

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Abstract: Southern Algeria is a vast region, as hostile as it is attractive, as harsh as it is fragile. Despite these constraints, oases have sprung up where life flourishes. Each oasis is the product of a collective experience, codified by its habits and customs. This gives the ksour (habitat) different typologies (depending on the morphological factors of the site, cultural factors and climatic factors). Shape, in fact, is influenced by the physical environment (which makes certain things impossible), climatic conditions, construction methods, available materials and technology (the tools needed to create the desired environment).

While the building geniuses of the Sahara respected the structure of the site, the same cannot be said of today's contemporary constructions, which seem to break with tradition and give a similar appearance to existing buildings throughout the country, despite the difference in context. With their disregard for environmental laws, today's establishments are under enormous pressure; eventually, their resilience is wearing thin. Hence the damaging impact on ecosystems and the built environment.

This study aims to highlight the significant difference between ancient and contemporary architectural production, and their impact on sustainability in a very difficult environment, this paper attempts to grasp the mechanisms of formation and transformation of the architectural composition in the city of Bechar over time by highlighting its impact on the environment, we will adopt a typological reading of architectural production selected according to their period of realization through history of vernacular architecture 'ksar' to the architecture of today. The aim is to accompany the spatial development of settlements in the Sahara by guaranteeing the overall balance of the environment (oasis).

Key words: Architectural production, Saharan settlement, sustainability, the Saharan environment; ksar Bechar.

Introduction:

Despite the hostile environment, several settlements established themselves in the Sahara from the north (Biara, 2014). Adaptation to the asceticism of the climate is specific to these peoples, indeed to this land (Côte. M, 1998). A group of ksour established (generally) according to common morphological principles, sharing a succession of significant events (history), define, once in an exchange relationship, a field of appropriation for the population of the region (Mousaoui.A, 1994). Man's built environment has never been, and still is not, controlled by specialists (architects, town planners, etc.). This environment was the result of popular architecture. Ksourian architecture is part of this popular architecture (Djeradi.M, 2012).

As a result, the ksour were designed as compact masses, leaving little room for the passage of sandy winds and the sun's rays, which are so intense in this region. The principle of the blind facade and the introverted house also served to pacify the living atmosphere. However, urban evolution has decided on a completely different architectural and/or urban organization: transmutations that give back to the symptomatic of the local context. On the one hand, colonialism brought with it a

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structure governed by colonial regulations, and on the other, the modernism recently adopted by Algerian towns and cities under the primacy of technological progress in the building sector and the discovery of new materials, has, a priori, altered the ancestral mode of configuration via buildings that rise higher than usual, with extroverted facades, without any consideration for the local context.

Like a universal image, this revolution in architecture is giving birth to new vocabularies, a new identity very different from the traditional architectural language, and particularly oblivious to the hot, arid environment. At a time when it should tacitly be in harmony with its environment. This phenomenon is causing an architectural, urban, and environmental crisis. One need only wander the streets of the city of Béchar, known as the gateway to the Algerian Sahara, to see evidence of this crisis.

The architecture produced in the past in the Saharan region, including the town of Bechar, has ensured secular sustainability. This was achieved by respecting societal needs, general culture and the regional environmental context. Nowadays, however, many people reject contemporary architecture, expressing discomfort, difficulty of use and indecent programs... The glass facade that clads the street walls reinforces this phenomenon.

In this regard, the central question that could be asked is: how can the resilience of built environments be restored while preserving the ecosystem in Saharan environments?

It is assumed that to do so, lessons must first be learned from traditional constructions, particularly in the ksour.

The aim of this study is to show the extent of the gap between ancestral architectural production and that of today, The objective of this study is to show the extent of the gap between ancestral architectural production and that of today, knowing that the subsequent challenges impact sustainability in a very difficult environment.

1. Research methodology

On the one hand, there is a need to grasp the mechanisms of formation and transformation of architectural composition, and to identify the structural permanencies associated with the cultural identity of places and the local context.

On the other hand, it must adopt a typological reading through history. According to A. Lévy, “typology is a means of grasping the common and different features of concrete and historical urban forms through comparatism, with the aim of grouping the most common among them into a few major classes, or major urban types”. “Typology erases the particular characteristics of objects to retain only the general features on which taxonomy is based”. (Ph.Panerai et al, 2009)

For Herrmann Lou (2017), “typology then refers to the idea of an operation to classify a complex reality on the basis of types built on general traits, making it possible to go beyond the particularities of a set of objects”, i.e. the analysis of the specific characteristics of the components of a collection or phenomenon in order to describe them and establish a classification.

This reading enables us to highlight the strengths and weaknesses, and identify the opportunities and threats to which the context is subject. On the one hand, it enables us to assess the situation in order to make the right decisions to improve it, and to provide strategic alternatives.

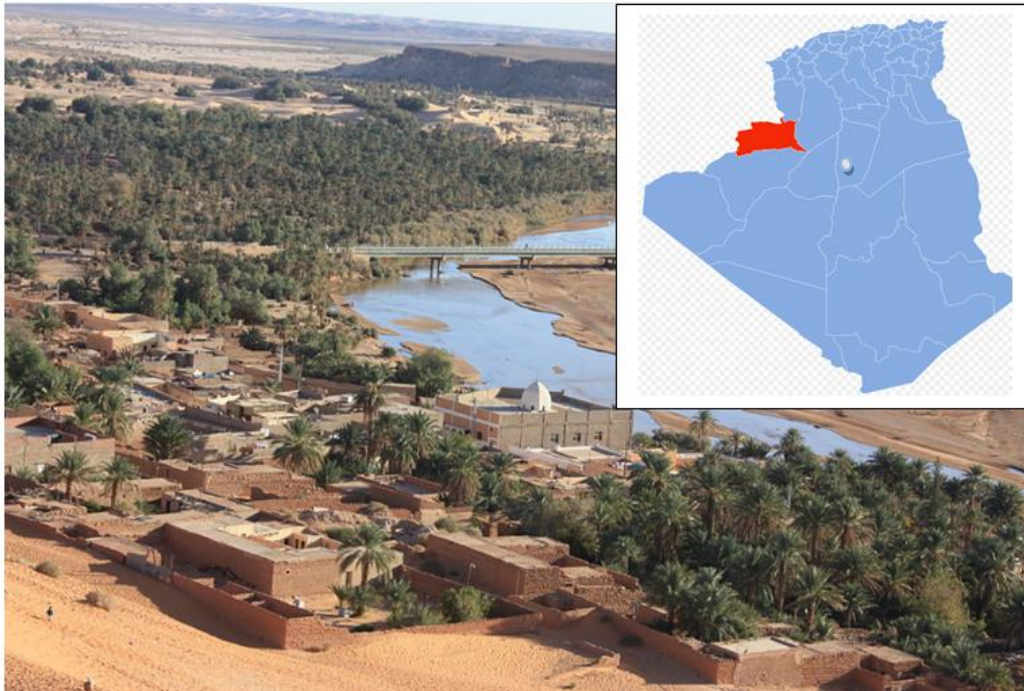
We have selected buildings according to their period of production and the way they appear in the urban fabric as our corpus of study.

2. Analysis and results

2.1. Presentation of the case study :

The Saoura region, located in south-west Algeria, is characterised by its desert landscapes and is criss-crossed by the Saoura Valley. It stretches out on either side of the valley, between the Grand Erg to the north and the Erg Ghidi to the south. Béchar, considered to be the capital of the Saoura, lies at the north-western edge of the Algerian Sahara. It has a surface area of 5,050 square kilometres and a climate characterised by long periods of overheating.

Fig.1. Geographical location of BECHAR



Source: The wilaya of Bechar, 2025, consulted in Wikipédia
https://fr.wikipedia.org/wiki/Wilaya_de_B%C3%A9char

- The compactness of the fabric (with houses leaning against each other) provides an opportunity for a micro-climate, with little space for dust, sand and sunlight.

2.2 Architectural typology through the history of Bechar city :

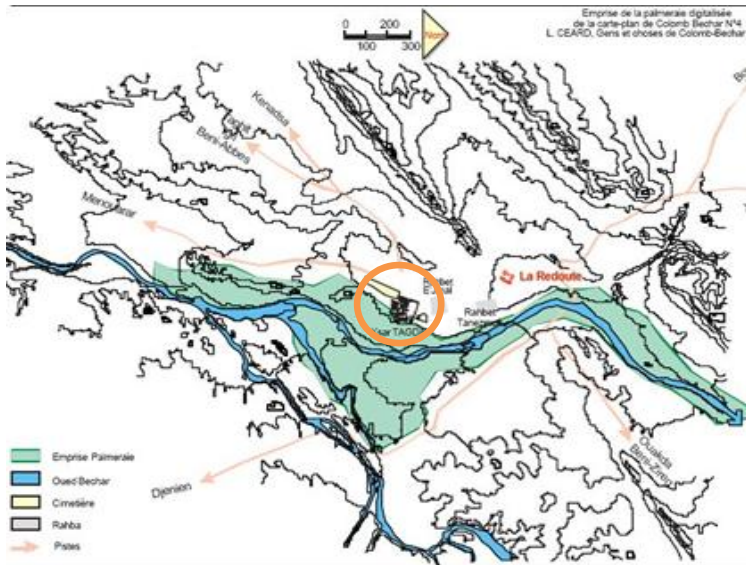
2.2.1 Traditional “Ksourian” architecture

The town of Bechar was founded on natural elements (the wadi and the palm grove). The first grouping, known as the “Ksar”, was the hub from which the town grew. The Ksar's function was to accommodate and protect the inhabitants, and to store foodstuffs, and it was structured into sub-groups for this purpose. The housing cell, at the heart of the Ksar's structure, reproduced the social organization of the village within the family micro-society. Among the strengths of this human settlement in the Sahara facing varied forces:

- The location close to the natural elements (the wadi and the palm grove), favors views of the wadi and the palm grove. Each house receives a cool breeze, so the site is well ventilated.
- The alleyways are naturally ventilated and shaded, a kind of covered passageway created by the projection of the rooms on the upper floors.
- The terraced system: the entire organization of the dwelling responds to the requirements of the social structure, climatic conditions and the technology used. The Ksar house is strictly linked to the village as a whole, while preserving family privacy: the doors and windows of the rooms open inwards; the thick toub walls guarantee acoustic and thermal insulation; the central courtyard channels the air, producing a current that cools the rooms in summer.
- The terrace is both an open-air space, used as a summer bedroom, and a place where the women can meet and communicate with each other.

Together, these form a veritable system of elevated walkways, in addition to the alleyways that were used even when the Ksar needed to be defended. The village, therefore, while appearing closed-in, narrow and stifling to outsiders, was for its inhabitants a place of protection, open and linked to the surrounding nature.

Fig.2. Map of Béchar in 1903



Source: Benmohammed. T, 2005 (Map based on aerial photo orthophotoplane from Aéro Survey Belgique, with topographic survey, INC, year 1969).

- The Ksourian façade, the Ksourian house opens onto the interior space. The patio wastdar, which acts as a thermal regulator, since the outer walls can reflect the sun's rays, and the openings in the outer facade act as ventilation.

- The blindness of the Ksourian facade preserves the privacy of the house, and above all that of the woman. this is a key concept in the design of the single-family home. (See Table 1)

- Materials: Technique and Building System

Pisé and unbaked bricks, dried in the open air and in the sun, enable the house to adapt to the cold of winter and the excessive heat of summer, which is not the case for new materials (concrete, breeze-block) and new plans, whose use is being developed in urban areas and even in certain ksour.

Table 1. Typological reading of “traditional architecture

Plan



Ksar Bechar Map
Source : Authors,2020

Facade

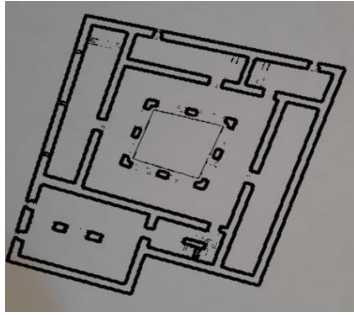


Source : INFO 898 COLOMB-BECHAR

Structure and materials

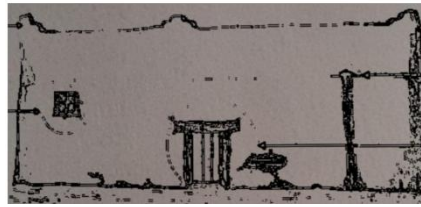


Source : algerietele, Tags : tourisme Algerie



Ksourian house
Patio ;wastdar

The patio, this central open space, is often bordered by an arcaded gallery.



Facade,Ksourian house
Source ; Authors, 2025

The facade of the ksar is virtually blind, with the exception of a few small openings. On the one hand, to ensure privacy, and on the other, to block out as much of the p as possible.



Ksar houses built entirely of earth (an environmentally-friendly material)

Toub is a material with proven isothermicity

Source ; Authors, 2025

2.2.2 Colonial architecture

The French occupation of Béchar dates back to 1903. It was late in coming and different from those in the north, center and east of the country. Given the harsh climate, unfamiliarity with the area and precarious means of transport at the time, the first settlers were extremely cautious.

Local knowledge was a prerequisite for any action or investigation.

The first French military administration, following a paternalistic policy imbued with the need for good relations with the local population, sought to adapt to the pre-existing structure. Architectural interventions were carried out, while maintaining a military logic of control, using traditional building materials and the technical *habilités* of the subjugated population.

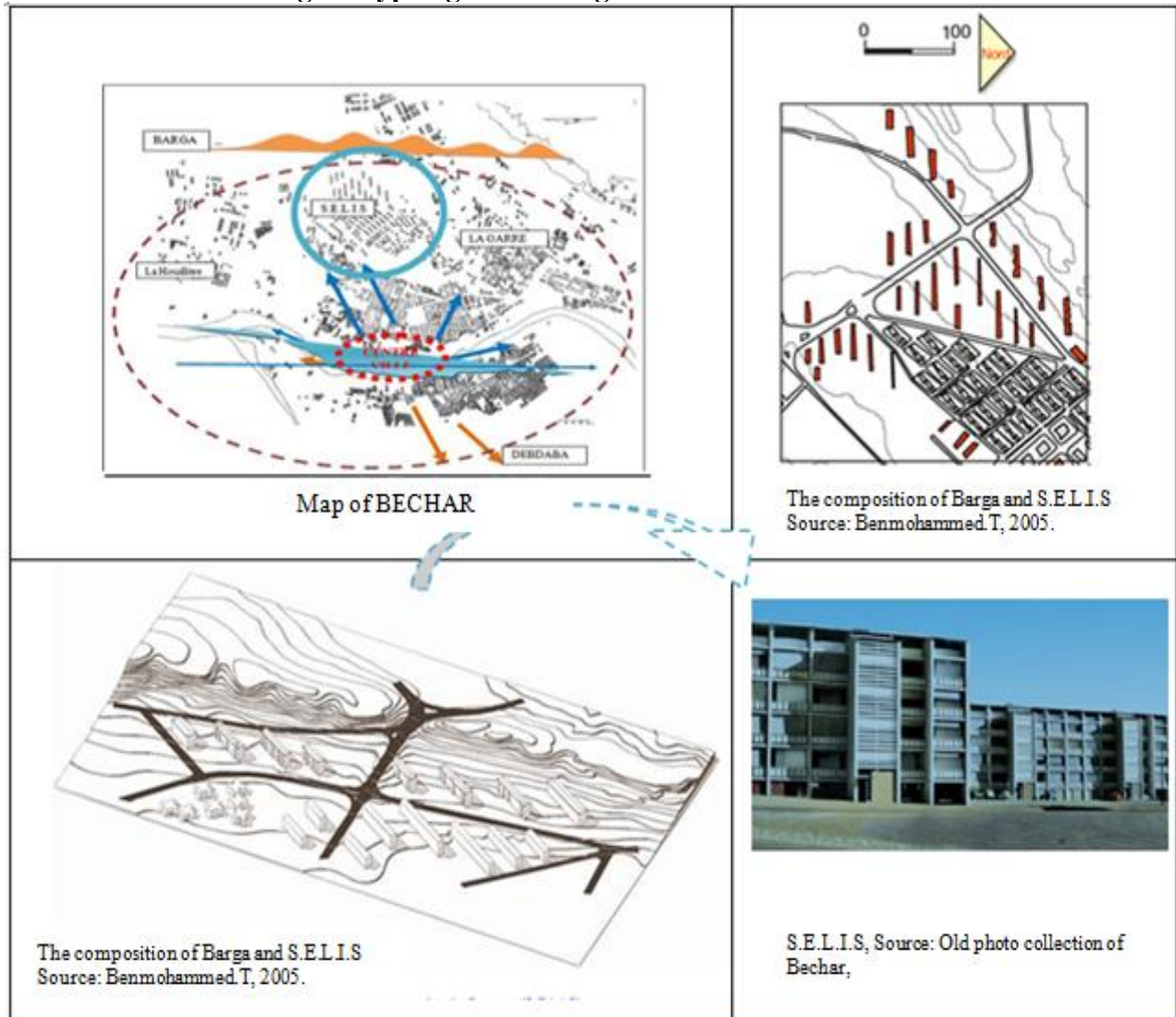
The number of spontaneous dwellings and *gourbis* increased, and the city's expansion became much more characterized by the differentiation of housing typologies and the segregation of ethnic groups. During the 1950s, the town asserted itself as a military and administrative center, and new neighborhoods and several facilities for the European population were added to the urban fabric, which expanded and joined the mountain ridge of La Barga to the west, with a residential neighborhood from which it took its name (PDAU Bechar, 2012).

During these years, urban planning took a progressive direction and embraced modern ideas. Indeed, both the debate and the production of spaces focused more on technical progress.

Faced with the particular climatic conditions of the South, temperature variations, wind and light, research was carried out to optimize new constructions, particularly in terms of thermal exchange, with the impact of double inverted partitions (thin external walls), ventilated terraces, sometimes even doubled, and metal joinery to withstand the vagaries of the climate. Double windows, reduced ceiling heights, orientation, ventilation and protection of walls and facades against direct radiation were all technical solutions adapted to the location and climate. The north-south orientation of the building was designed to ensure double exposure from east to west, and as much as possible, the dwellings on the upper floors were designed for better ventilation and aeration. Hygiene also played an important role, with the introduction of mains drainage and wastewater treatment to prevent the proliferation of fly-borne diseases.

For example, the S.E.L.I.S housing estate and the Barga housing estate (1948-1962) are organized on a north-south axis (a new configuration). (See Figure 03)

Fig.3. Typological reading of “colonial architecture



2.2.3 From post-colonial to contemporary architecture :

After independence, the town of Bechar underwent phenomenal change, undergoing major transmutations in a number of respects and giving birth to an urban form that differs from the original.

A simple reading of the city of Bechar today reveals a mosaic of urban and architectural landscapes. The traditional nucleus (ksar), the colonial nucleus, housing estates on the edge of old districts, large complexes built by independent Algeria and, finally, spontaneous and self-built housing all exist side by side. Urban growth in this plural landscape is subject to a demographic surge, from the center to the periphery at the edge of the urban perimeter (Messafri.N, 2023), which has in fact become the preferred location for ZHUN programs and housing estates:

Fig 04. Typological reading “from post-colonial to contemporary architecture”.

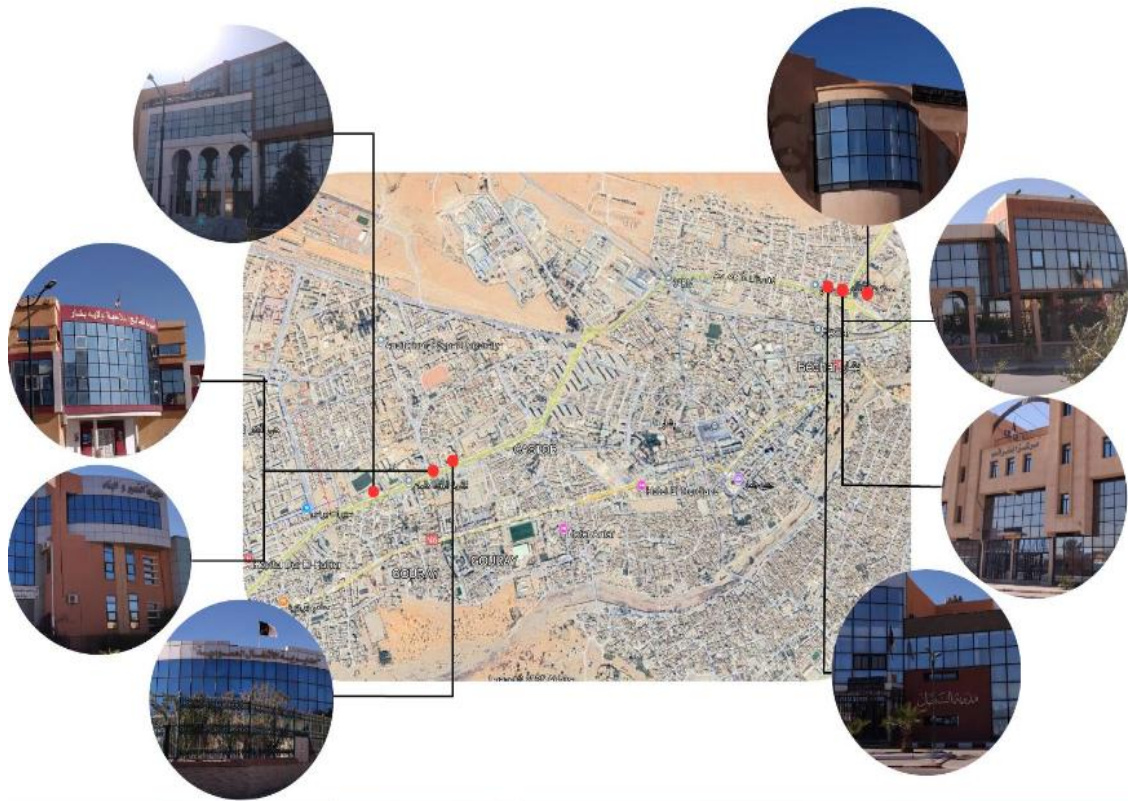


The (Z.H.U.N) is quite different from previous production methods. The roadway divides the space into islets with different shapes, which determine the built position.

The residential subdivision in Bechar represents the dominant mode, and is one of the most preferred built environments for citizens participating in the construction effort. This is borne out by the growing number of housing estates in Bechar, which are unfortunately of varying quality in urban, architectural and environmental terms.

Contemporary constructions seem to break with tradition, giving a similar appearance to the spatial organization of the north of the country, as well as an identical and analogous architecture throughout the country, despite the difference in climatic context. We have seen the emergence of a large number of contemporary office buildings with a modern character, let's say with curtain walls featuring large glazed surfaces. Architects have used light curtain walling techniques (see figure 5), the aim of which is to express a modernized aesthetic appearance through transparency, despite its conductivity in a fairly warm climate. As a result, the use of greenhouse gas-producing air conditioners has become commonplace, increasing pollution and reducing environmental and climatic conditions.

Fig.5. Views of contemporary public facilities in Béchar



Source : Authors, 2025

3. Interpreting the results

The houses of the ksar, built entirely of earth (an environmentally-friendly material), boast a know-how that has developed specific techniques to adapt the house to the very austere climate, and a bioclimatic space par excellence, the “patio”.

"You have to be proud of having inherited the best and noblest of the past. One must not sully one's heritage by multiplying past mistakes" (Gandhi, 2000). Indeed, the ksour space has retained its diverse and significant conceptual splendor, and has been able to withstand the vagaries of man's actions and the climate in a temporality qualified by the transformation and rapidity of change that have become commonplace in our time. Today's ksour are indisputable proof of their formidable adaptation to such an environment, with their different typologies. Form, in turn, is modified by climatic conditions (the physical environment that makes some things impossible and favors others), construction methods, available materials and technology (the tools needed to achieve the desired environment). (Rapoport. A, 1972).

Nevertheless, like all Saharan towns, Bechar has been affected by excessive, uncontrolled development, resulting in a loss of architectural and urban identity.

Today's urban forms and contemporary architecture deviate from tradition and are modelled on those produced in the north of the country, despite a very different geographical context, leading to urban heat islands, climatic changes, etc.

Conclusion

The vernacular architecture inherent in the Saharan region, and more specifically in the ksour of Béchar, highlights a residential space that is strongly attached to its natural (site and climate) and socio-cultural environment.

The study clearly shows how our heritage has asserted itself, as an object of cultural practices and inherited values. It also shows how the city has been nourished by the metamorphoses of the past, under the auspices of sometimes antagonistic chronological interventions.

Today, architectural production in the town of Bechar heralds a recognition of the vernacular and then colonial legacy, but at the same time raises questions about its course.

Based on the results of this study, certain recommendations can be formulated with the aim of seeking a quality architecture that responds to climatic and environmental needs. The aim is to avoid ready-made solutions, to reflect on the needs and potential of a site, the questions it poses, the context in which it fits, and finally to study it before acting. They therefore aim to achieve an essential objective: how to reconcile urban and architectural development with the quality of the living environment.

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