

## Ghadames, Libya. A traditional earthen settlement, resilient to crises and environmental challenges

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### **Abstract**

*Ghadames, a World Heritage property, is an outstanding example of a traditional human settlement, representative of a traditional culture and human interaction with its environment. The old town has a symbiotic relationship with its surrounding oasis. Its earthen housing design is extremely original and climatically adapted. Serious human and environmental challenges increased recently. The community of Ghadames has however always been, responsible for the exceptional qualities of this site, from its inception to its conservation. An active local convenient authority was purposefully set up for conservation. Fortunately, the present crisis in Libya only caused indirect damage. . Our paper aims at better inform about Ghadames little known heritage features, encountered challenges and conservation achievements. Through this particular case study, our multi-faceted paper aims to demonstrate how a comprehensive approach, in construction, architecture, urbanism, landscaping, irrigation, climate, law and institutions, is important for understanding and planning conservation issues.*

**Keywords:** *earthen architecture; oasis settlement; climate challenge; comprehensive planning; world heritage.*

### **1. Introduction**

Ghadames used to be a gateway for a major route to the great Sahara Desert and its Southern areas for commercial caravans and Sufi religious circles. Its oasis in a desert region is located about 430 km from the capital city of Tripoli at the present junction of Libyan borders with Algeria and Tunisia. It is very hot in summer, as temperature can reach or exceed 45 °C (113 °F). Few rains occur in winter.

The city was in the past the seat of a Roman garrison and an Episcopal city later. During the first part of the 20<sup>th</sup> century, it was successively occupied by Ottoman, Italian and French powers but didn't suffer from fighting,

not even recently, with the exception of a US limited bombing during WW2. An old airport doesn't seem much frequented.

According to local traditions, the town emerged and developed beside Ain al Faras water spring. Beautiful fortified granaries are to be found on the road to Tripoli, like in Nalut and Qasr al Haj. Some of its features, like covered streets, are somewhat similar to those of Temacine and Tamehat in the South of Algeria. This vernacular settlement is consistent, outstanding, authentic and rather undamaged. No other similar settlement was so well safeguarded in Libya and the North of Africa. Its specific features are however still rather ignored not completely described.



Fig. 1. Closer aerial view with roof terraces.

In 1986 an ICOMOS mission went to Ghadames and produced a report that served as a basis for the inscription of the city on the World Heritage List on the same year. This inscription probably contributed to raise the local, national and international attention. A conservation *modus operandi* was however apparently long to be found.

Our own first mission to the site dates back to 1998 and somehow continued until recently, with long interruptions. It implied visits and meetings with community leaders and authorities in charge, as well as access to original documents. Based on this experience, this paper will comprise three sections: Architectural and environmental features, Challenges and opportunities, as a World Heritage in Danger.

## 2. Ghadames Architectural and Environmental Features

A somewhat circular, high earthen wall surrounds the old city (12 ha) and its oasis (225 ha together). This is probably why some western early visitors mentioned a “round city”. A sort of symbiotic relationship developed between the city and its oasis. One would not have developed without the other one and the growth of both was probably related. Moreover, palm groves and

residential districts are interpenetrated. In the oasis water channels from Ain al Faras major spring connected earlier, central irregularly shaped agricultural parcels. On the periphery, orthogonal parcels are linked to more recent artificial wells, Ain Talian and Ain Francis, provided during the Italian and then the French occupation. The total length of channels is of about 13 km and caretakers do attend them.

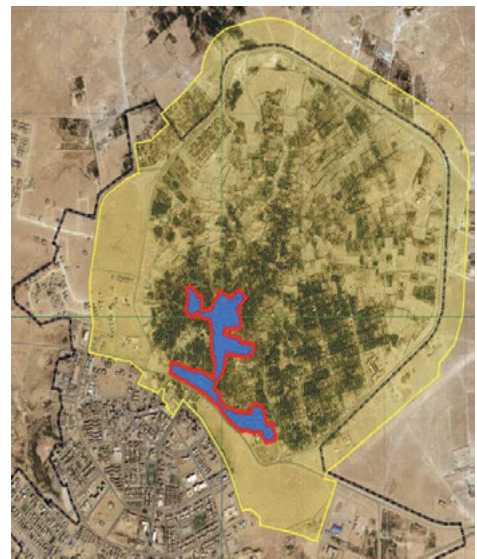


Fig. 2. Aerial view. The World Heritage site is in blue and its present boundary is in red.

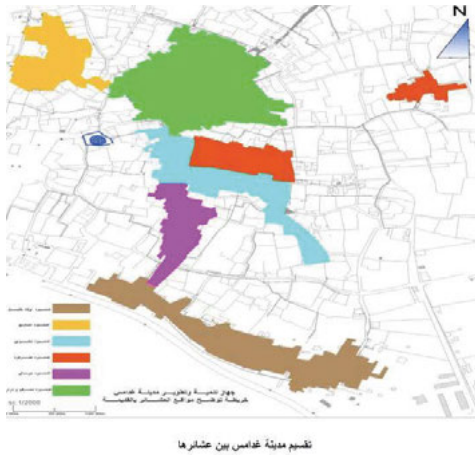


Fig. 3. Social Map. Each tribe has a different color.

The Old Town of Ghadames included more than 1250 houses, 23 mosques, Sufi centres and some shops and more interestingly 7 physically attached but distinct and gated residential districts. A different tribe or coherent social group dwelt in each one. Most were Berbers with a presence of Touaregs to the West. A late Ottoman administrative district faces south, along a major road. There, is also located the main access gate. As the street pattern is ramified, similarly to a tree, it would be possible to access any house from the main entrance. There is something organic in this social and physical distribution. The built area is not compact but consist of thinly connected compact blocks.

At close level, the internal streets are designed for pedestrian and animal traffic. Benches along the houses walls allow elderly people to sit and chat. Arches across streets support rooms above. Occasionally, an absence of roofing provides lighting and air. No water distribution pipes are provided below for fear of an accidental burst that may provoke a flood that would result in the melting down of adjacent structures. Some writers often repeat that men's traffic would be located at the street level, while women's traffic was located at rooftop level. This would be a powerful feature, but realistically the feminine specific upside walks would probably be limited to a few close houses rooftops.

At the urban level, climate protection was provided thanks to an exceptional density and narrow covered streets. Each house is protected as much as possible from sunrays by the walls of adjacent buildings. When a house has a side located along a palm grove, it has no doors and its windows are small on that facade. Anyway palm trees provide shade and a cooler air gets inside from inside the house from the street and from the plantation. Warm air rises naturally and is evacuated through the roof shaft. The roofs are flat and regularly whitewashed with lime for waterproofing.



Fig. 4. Traditional Ceiling, ith palm trunks, palm stems and a shaft.

Houses are low rise, with between 3 to 4 levels usually. Their walls are made of earth on stone foundations. They are constructed with mud bricks and externally plastered and whitewashed. Roofs were supported by palm wood and palm stems. Doors and openings were based on an elaborate carpentry. Contrarily to other Mediterranean or Oriental traditional settlements, Ghadames houses do not include courtyards. They are however arranged around a central covered room with a shaft in its ceiling, for lighting and air renewal. The periphery of this central space is somehow sculpted with stairs, cupboards and openings unto low peripheral rooms. Its white walls are painted with red decorative patterns. For esthetical purposes, some sets of domestic traditional utensils are permanently displayed on shelves.

People sit below on benches and rugs. The kitchen is located upstairs and directly connected to the rooftop, perhaps to avoid smells. One niche is covered by a red fabric and is called *Kuba*. This is where the bride waits for the groom, where the mother is congratulated for her newborn baby and where the widow receive condolences if her husband dies



Fig. 5. A road in the oasis.

### 3. Ghadames challenges and opportunities

The population estimate of the city was of 4,000 persons in 1850, of 1,700 in 1952 and 12,700 presently. The Government started supplying apartment blocks housing in a new adjacent district outside the oasis since 1969. Around 1983 the old city was practically empty of inhabitants. Many former dwellers do however maintain their previous homes and even return during the summer hottest days. An informal watch is provided to prevent looting and degradation. As traditional houses have normally few external openings, the old city doesn't look like a ghost town and before 2011, a modest stream of tourists appreciated its visit. Cultivating palm groves became difficult at the end of last century, because of technical problems at Ain al Faras. Cultivated land shrank. Libya nearby borders were definitely closed because of security and political issues. This accumulation of problems raised serious concerns about the future of Ghadames as a whole.

In 1986 fortunately, the "Old town of Ghadames" was inscribed on the World Heritage List according to criterion V with an acknowledgement of the Integrity and Authenticity of its Heritage.

« **Criterion (v):** Ghadames is an outstanding settlement in the Saharan pre-desert renowned for its exceptional built heritage, erected thanks to long-lasting traditional practices resulting from the particular demands of the harsh climate. For at least 2,000 years, the city has played an important role in the trans-Saharan trade network. It has been a crossroads for the major cultures of the African continent and the Mediterranean basin, while also developing its own unique architecture and traditions related to its historic origins and subsequent interactions. (...) The balance between the inhabitants and the environment has been fundamental to the development of the city's unique urban character, but is also an important factor in its vulnerability to human and climatic change.»



Fig. 6. Inside the oasis.

As Ghadames is located in a remote area with a rather difficult access, external scientific missions remained few and without being exhaustive, we may mention:

- A University of TsingHua architectural survey, undated, probably in the 1980's
- A UNESCO inter-sectorial mission, 1983
- An ICOMOS (as advisory body) field mission to evaluate the nomination of Ghadames, 1985
- A UNCHS (now UN Habitat) feasibility study for a conservation project, 1987 and 1990
- A UNDP/WTO Master Plan for Tourism in Libya, 1997-1998

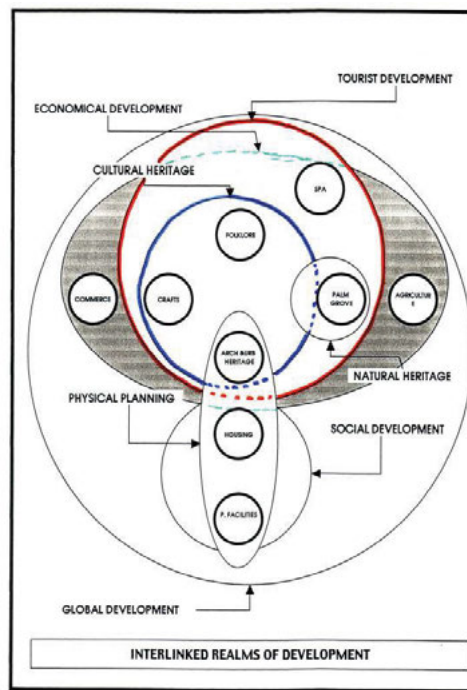
- A UNDP-UNESCO mission for a Rehabilitation of the Old City of Ghadames, 1998 and 1999
- A CRAterre assistance to the improvement and use of traditional materials and the training of local craftsmen, 2008-2010

The UNDP-UNESCO was based on a comprehensive and strategic approach, proposing a sustainable future for Ghadames based on its cultural, environmental and human resources, including:

- Development of Tourism (particularly small scale guest houses in traditional homes)
- Revitalisation of economic, social and cultural activities: Housing and community facilities, Traditional Construction, Traditional Crafts, Irrigation and Agriculture)
- Comprehensive Physical Planning (GIS, Rehabilitation and Conservation Plan, Comprehensive Master Plan, etc.)
- Accompanying measures (Developing know-how and awareness, improving capacities)
- Institutional Framework
- Working Agenda

The Ghadames community has long been dedicated to the conservation of its old town. An appropriate administrative, financial, technical and legitimate tool was needed to undertake its projects Existing tools were not sufficiently adequate. A dedicated authority able to engage with all local, national and international stakeholders was necessary. The Service for the Planning and Management of the Old City of Ghadames (SPMOCG) created by law n° of 1994 and the he General People’s Congress executive Decree n°63 of 1995. This agency was continued by the Ghadames City Promotion ad Development Authority (GCPDA, or the Authority for short) created by State Decree n°401 of 2007. To our knowledge, in Libya, such authorities were set up only in Ghadames and Tripoli. Effective protection is guaranteed through the collaboration between the local Authority, the development partners and the Department of Antiquities, the Urban Planning Department, local City Council, civil society

associations, the Tourist Police, and the Committee for Management, Implementation of the Conservation and preservation strategy of the five Libyan World Heritage properties. Maintenance and salaries are usually locally provided, but Conservation Projects are normally nationally budgeted through “capital funding”. Abdulkader Omar, Head of the Authority is a knowledgeable, dedicated and efficient member of the community.



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Fig. 7. A proposed strategy combining the Conservation of Cultural Heritage with Comprehensive Development (1999).

The Authority had to face several difficult challenges: a decaying built fabric, a deserted town and a worsening economic situation. One of the first initiatives was to organize an annual festival of folk arts that attracts crowds of visitors from Ghadames and the rest of the country. The local community participated massively as actors and participants and became even more proud of its identity as well as of their tangible and intangible heritage. However, 191 buildings collapsed over time on a total of 1205. Hopes based on tourism momentarily expired ten years ago and cultivated land

substantially decreased in the 1990's and 2000's. Ghadames had to face new environmental concerns. As mentioned, the whole oasis shrunk about twenty years ago. In 2003 the cultivated area dropped to a proportion of 49,25 % of the oasis surface. It rose again to 80% in 2020 thanks to the repair works undertaken at Ain al Faras, the digging of 5 new wells to a depth of 450m and the repairing of 18 km of water channels, and of 36 km of farms external wall. The Authority also subsidizes the replanting of palm trees in a proportion of 75%.



Fig. 8. A meeting at Ghadames City Council.

The GCPDA passed 250 working contracts with small contractors between 2007 and 2013. Climate change was expected to increase drought, but extremely unusual heavy rains occurred in December 2017 (15 buildings collapsed) and then again in March 2019 (6 houses collapsed). These disasters were due to the lack of provision for exceptional rainwater evacuation. A limited fire also occurred in the oasis in July 2019. About 50 to 100% of 2017 damage was already repaired in 2020. Maintenance and large-scale waterproofing campaign had also to be undertaken everywhere to prevent this earthen settlement from melting. Aerial photographs seem suggesting a rise in the number of detached buildings in the oasis. An assessment is still not easy to provide, but if these constructions were intended for housing and not for farming activities, this would mean that a creeping urbanisation is underway, which would be a rather regrettable development.

#### 4. Ghadames as a World Heritage in Danger

As a World Heritage property, Ghadames should take into account the rules included in present Operational Guidelines, even if some of them were not yet formalized at the time of its inscription on the List. The property boundaries were originally restricted to those of the old town itself, although the article 100 of the Guidelines mentions that: “*For properties nominated under criteria (i) - (vi), boundaries should be drawn to include all those areas and attributes which are a direct tangible expression of the Outstanding Universal Value of the property, as well as those areas which, in the light of future research possibilities, offer potential to contribute to and enhance such understanding*».



Fig. 9. Disaster due to excessive rainfall.

The ICOMOS report of 1986 also stressed the importance of the oasis, concluding that the «*management of the oasis, whose survival is necessary for an understanding of the history of the site and for the ecological equilibrium of the city, special attention should be paid to traditional systems for the irrigation of the palm tree grove.*». It is hoped that a future Retrospective Statement of OUV and a Minor Boundary Modification would give justice to the global interest of this property. The State Party is also progressing in the development of a Management Plan including Regulations and a Building Code to be used in the Property and its Buffer Zone.



Fig. 10. Reconstruction after disaster.

The World Heritage Committee inscribed the Old Town of Ghadames on the List of World Heritage in Danger in 2016, mainly because of the potential threats and destruction consequent to the armed conflict in Libya that began in 2011. Ghadames has fortunately remained far from any combat activity and its OUV was not jeopardized. Indirect threats were however considered because of the reduction of capital funding and some maintenance issues. A joint Reactive Monitoring Mission (UNESCO/ICOMOS) has still to be postponed, but a set of corrective measures and a timeframe

for their implementation is already decided. The World Heritage Committee has accepted in July 2021 a “Desired State of Conservation for the Removal from the List of World Heritage in Danger” (DSOCR), elaborated with the World Heritage Centre, ICOMOS and the State Party. The Government in Tripoli has pledged a consistent financial support.

## 5. Conclusions

Given the diversity and specific features of the site, as well as all the met challenges, its conservation is facing, a comprehensive, original and adapted strategy has been needed. This strategy seems now to be found and already at work since about 15 years. Anyway, the main driver for its exceptional qualities, from its inception, its development to its present conservation is no doubt essentially the local community. One would certainly wish that living in the new town would not gradually sever the links of the new generations with the old one and that Ghadames would always remain secure and climatically adapted, benefitting from a sustainable development allowing the conservation of its outstanding cultural heritage, together with international assistance.



Fig 11. A central room with traditional decoration.

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