

# Igoudars against climate change in Morocco



RIME EL HARROUNI

Euro-Mediterranean University of Fez Institution, Morocco / Faculty of Architecture and Urbanism, University of Mons, Belgium

MOROCCO

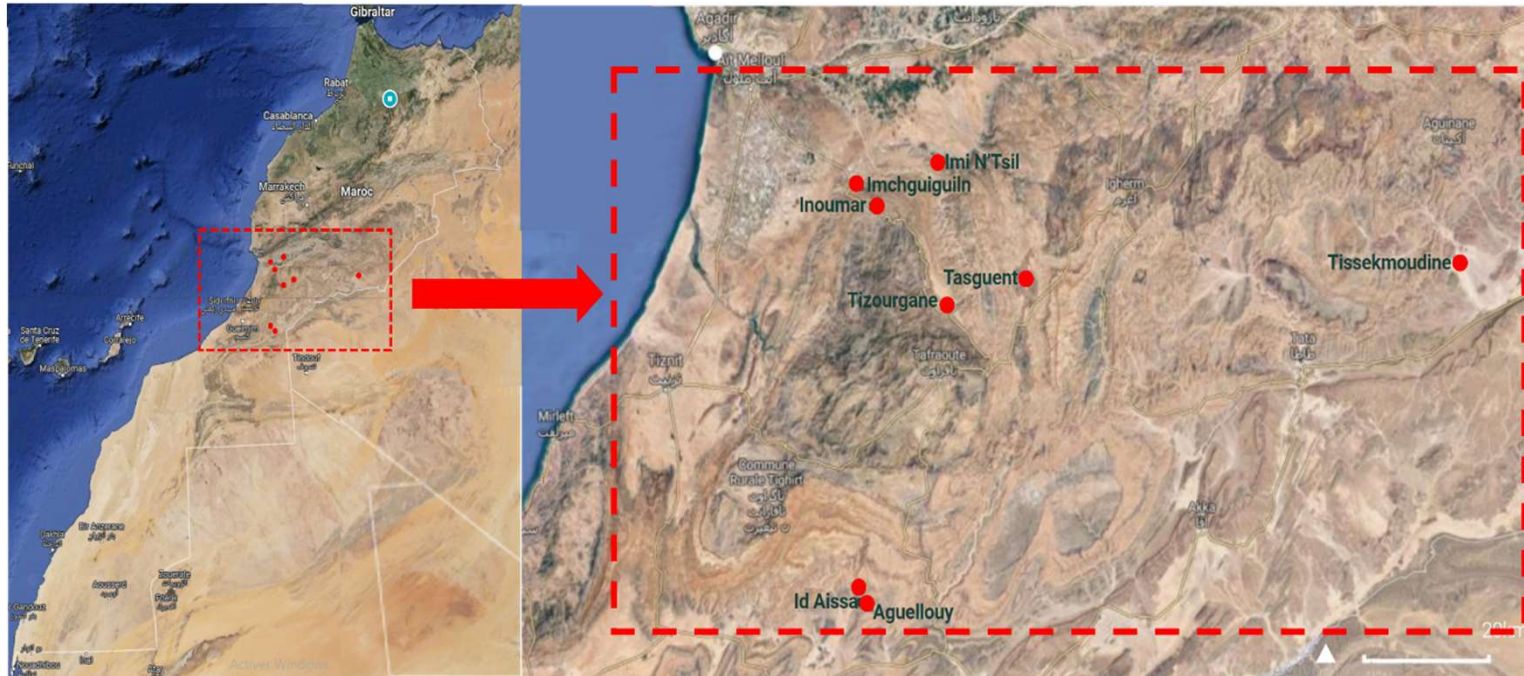


# Introduction



The word Igoudar, translated from Amazigh, means “fortress”, “wall” or even “collective attic”. Built on several floors, these granaries are closely intertwined with cultural practices, rituals, and oral traditions that sustain community identity and continuity. Igoudars are also environmentally friendly, supporting biodiversity and water-sensitive design.

# Geographical Context







The grouping of collective attics in Morocco corresponds to a specific geographical area. In the Anti Atlas massif, there are dozens of them; Amtoudi, in the province of Guelmim, includes two the ones of Aguellouy and of Id Issa, Then we find the Imchguigulne, Inoumwr and Tasguent, Agadir n Tioualioun, Tilmezdirhal, Sidi Yaqoub, Agadir Imi Tsil, Imrharen, to name but a few.

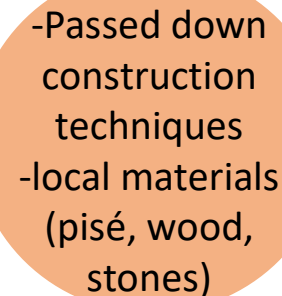
# Values and Attribute ( OUV)

- Considered as the oldest bank systems in History , these collective attics called Igudar have great potential to be registred as world heritage site as it answer some criterias of the OUV.

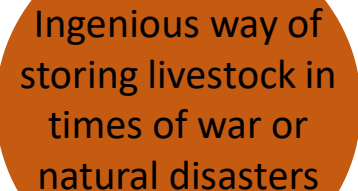
## VALUES :

-  Architectural and Historical values
-  Socio-economic Value
-  Cultural Value / community involvement
-  Ecological and Environmental Values

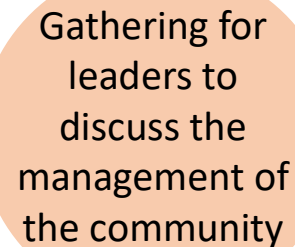
## ATTRIBUTES:



-Passed down  
construction  
techniques  
-local materials  
(pisé, wood,  
stones)



Ingenious way of  
storing livestock in  
times of war or  
natural disasters



Gathering for  
leaders to  
discuss the  
management of  
the community

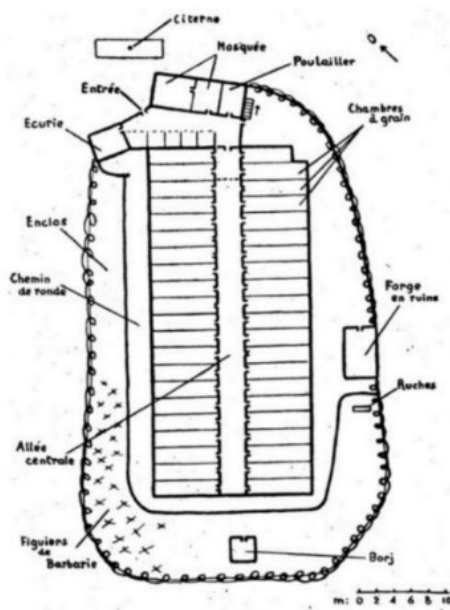


Traditional  
Land Use  
And indigenous  
settlements

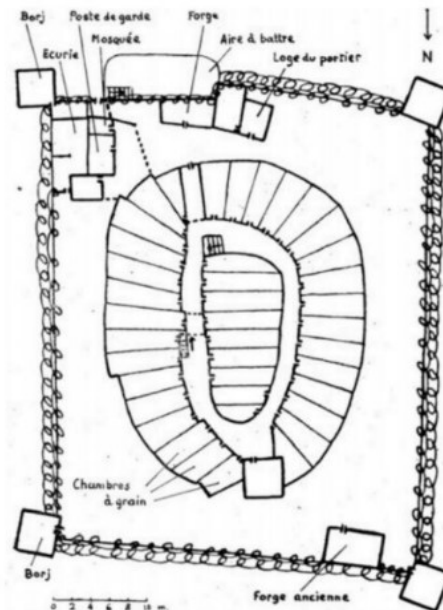


# Architectural and Historical Values

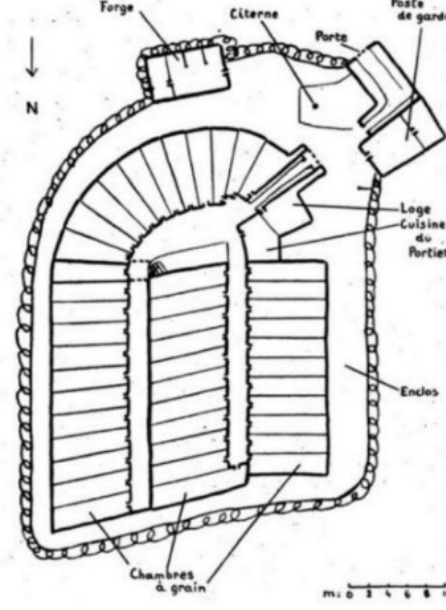
## Ingenious design



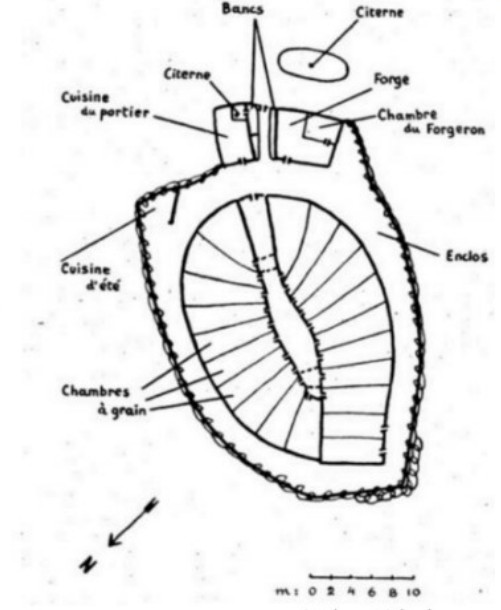
**Igoudar Imi n Tsil**



**Igoudar Sidi Yaqoub**



**Igoudar Imrharen**

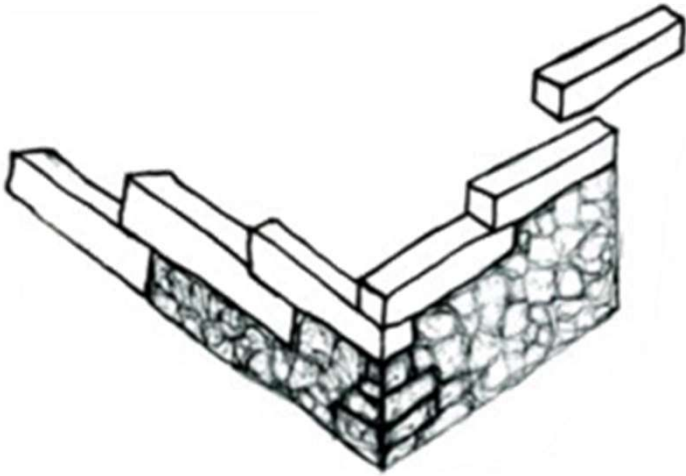


**Igoudar Tioualioun**

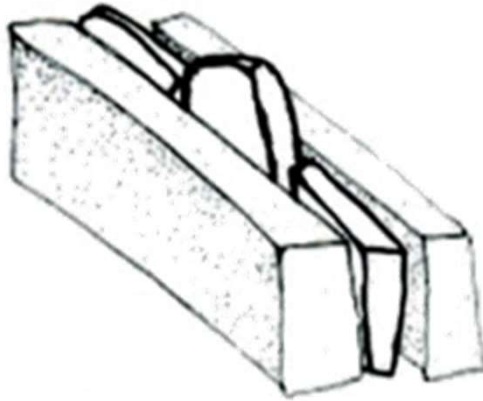
Various types of spatial organizations can be found in this traditional built heritage, ranging from 2 to 3 stories and containing anywhere from 40 to 140 rooms.

# Architectural and Historical Values

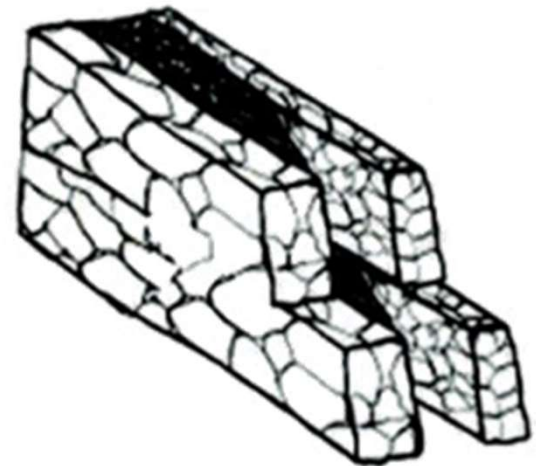
## Construction techniques



**Wooden stringers forming chaining**



**Core of walls with mortar technique**



**Core of walls with stone block technique**

Source : Salima Naji (2006) , Greniers collectifs de l'Atlas. Edition Edisud

For most of the Igoudars located on cliffs, the rocky peak was utilized as a foundation for the walls and floors. A cement and stone base, adjusted to the roughness of the cliff, was used as a foundation, with the chaining primarily made of Argan wood installed on top.

# Architectural and Historical Values

## Local Materials



Types of stones used in the construction

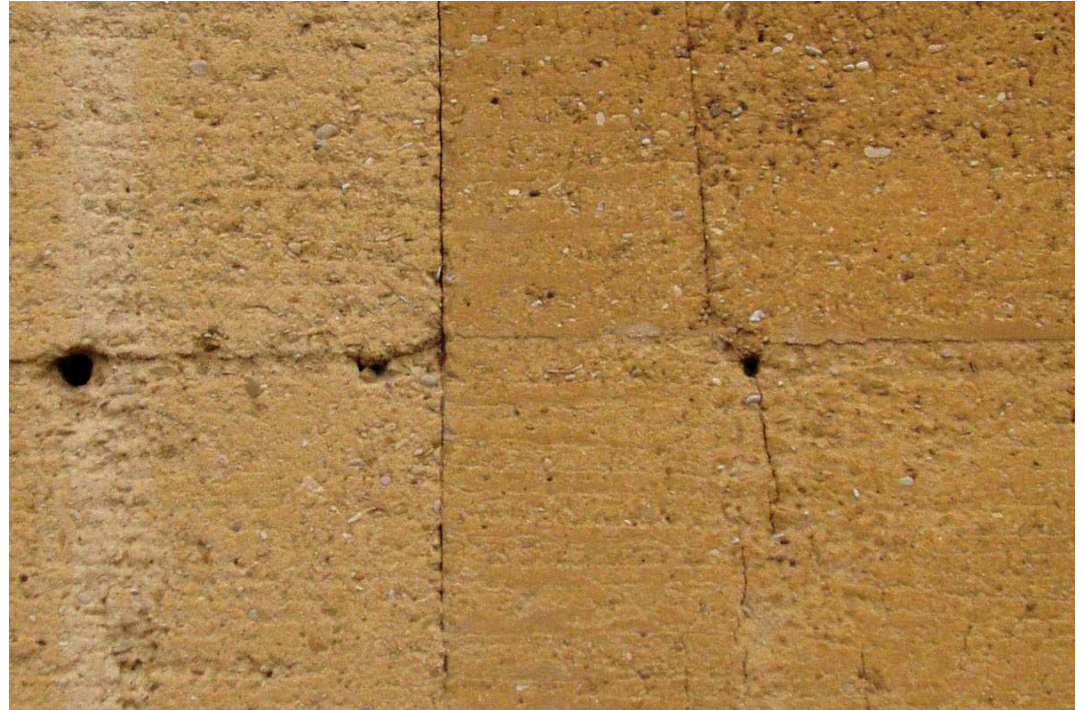


# Architectural and Historical Values

## Climate adaptation



Argan Wood for the ceiling



Pisé



# Socio- Economic Values

**Communal Storage :** Facilitate way of storing livestock, harvests and valuables in times of war or natural disasters , ensuring economic security.

## Social Hubs :

Gathering places for community leaders to discuss and manage local affairs. This highlights their importance as centers of social and political life.

## Economic activities:

Ensure food security and economic stability by preserving surplus produce for future use. Furthermore, as living heritage sites, Igoudars attract cultural tourism.





# Cultural / Spiritual Values

## Cultural practices:

Embedded in local rituals, festivals and celebration

## Oral Traditions:

Knowledge transferred through generations

**Spiritual significance:** Designated areas for religious practices, like mederssa, the Ttaleb the zaouïa, mosque, a timzguida, an akhrbich...





# Ecological / Environmental Values

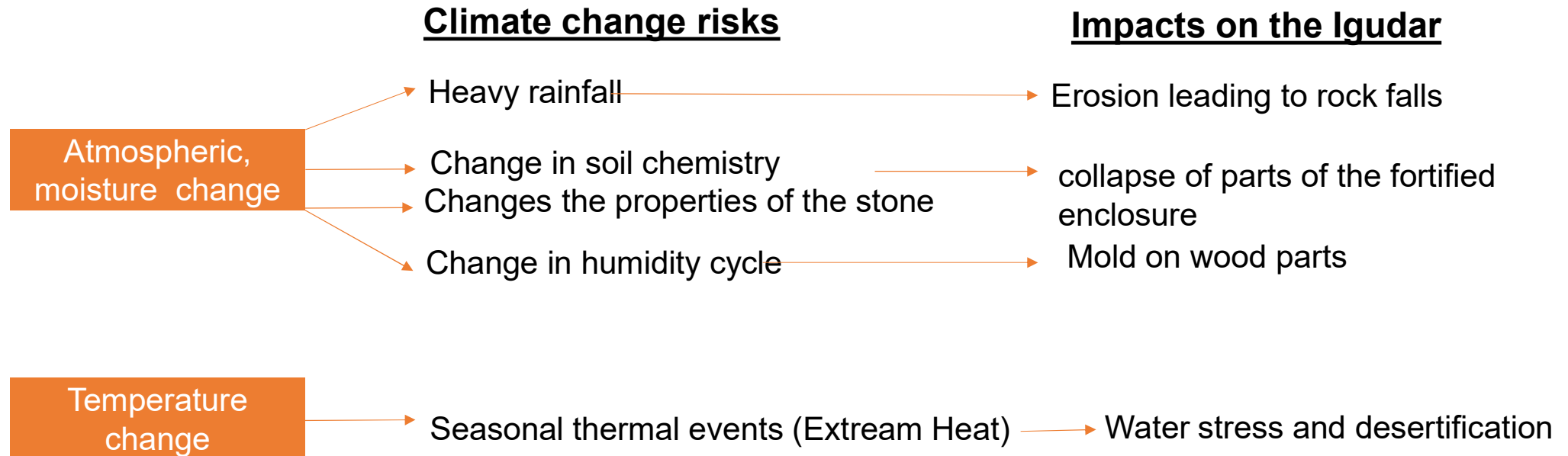
- Creation of air currents which cool the granary in summer and allow better conservation of cereals,

- Rainwater recovery

- Thick rammed earthen wall



# CLIMATE CHANGES CAUSES



## Socio-Cultural impacts on the local community

- Partial abandonment of the property
- Traditional storage and farming practices tied to cultural practices, may become unsustainable
- Impact on the Structural Integrity :dissolution of community and mutual aid values



## Past and Current Initiatives

- Diagnostic operations in the region affected by the earthquake of September 2023, were carried out by 470 volunteer architects from the national order coming from different regions of Morocco.
- A convention was signed in April by several Moroccan experts, administrations and public organizations, including the aim of creating an igoudar interpretation center.
- Morocco has completed the development of a National Action Program (NAP) for Combating Desertification (CD), marking a significant milestone in fulfilling its obligations under the United Nations Convention to Combat Desertification





# Reduction Goals and Targets

- Communicate and transfer knowledge:

- Improve the understanding of the richness of this multicultural historical living-together and the socio-economical know-how that we find in the Igudar

- Raise Awareness with educational program by organizing on site workshop with students from the field of architecture, Engineering, anthropology...

- Minimise vulnerability to climate change impact:

- Develop Climate-Resilient Agriculture

- Implement adaptive governance structures that can respond to changing environmental conditions.

- Develop management and conservation approaches for the changing environment:

- Strengthen early warning systems to provide timely information on climate-related risks.

- Embrace an integrated approach that considers the interconnectedness of ecosystems, addressing both natural and human components

# Strategies and Actions

## Adaptation Actions

- Encouraging economic diversification beyond agriculture like creating sustainable economic opportunities through tourism.
- Setting up a group of experts charged of Inventorying all the studies that retrace the whole history of these Igudars in order to sensitize the local community and the policy makers of the importance to inscribe them in the world heritage site list.
- Involving the local community in decision-making processes, and ensuring that the community benefits from the preservation efforts to foster a sense of ownership and collaboration.

## Mitigation Actions

- Application of lime to roofs in order to sanitize the igudar and protect them against the rain.
- Build reinforcement walls to help stabilize the structure and reduce rock falls
- Implementing sustainable water management practices (irrigation systems and rainwater harvesting...)
- Planting native vegetation and adopting soil conservation techniques to combat desertification, improve soil fertility and reduce erosion.



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