Traditional Architecture of Kutch Region of Gujarat

Jemish Bhanubhai Lathiya
Department of Architecture & Interior Design, Shantaben Manu Bhai Patel school Studies and Research in Architecture & Interior Design (SMAID), New Vallabh Vidyanagar (Anand), Gujarat, India.

***Abstract* - The traditional architecture of Kutch is the outcome of the prevailing topography, extremes of the climate and other natural forces. Moreover the vernacular architecture merges well with the desert at the backdrop. The traditional architecture forms the backbone of social and cultural set up of the place. It is essential for this architecture to retain its integrity. It commands deep interest and respect as it represents and reveals the many faceted realities of the people living there. In the Traditional architecture, buildings were designed to achieve human comfort by using locally available building materials and construction techniques which were more responsive to their climatic and geographic conditions. Learning from traditional wisdom of previous generations through the lessons of traditional building can be very powerful tool for improving the buildings of the future.**

***Keywords* - Traditional Architecture, Climate Responsive Building, Vernacular Architecture, Sustainable Construction, Living Style.**

I. INTRODUCTION

"Kutchua" that is what the northwestern part of Gujarat is named as. With a rich treasure of tradition, it is a delight for tourists and pride for the inhabitants. The northwestern Gujarat has its own vernacular architecture which are developed throughout the ages and has been an inhabitants themselves with locally available material, the traditional building are time tested, sustainable and sensitive to the microclimatic conditions and natural calamities, including earthquakes which the northwestern region is prone to.

Many theorists and distinguished architects like Hassan Fathy have promoted the underlying concepts on traditional architecture to form contemporary design. However unlikely in the northwestern region, the traditional building has been replaced by fast growing concrete jungles, which are not sustainable or sensitive towards the natural calamities and microclimatic conditions.

The local Government of these states needs to be sensitive in drafting the local byelaws and planning guideline which promote or allow incentive for usage of traditional architectural forms and concepts so that this problem can be tackled meticulously. The first step towards this journey should be a study of the housing typologies of northwestern Gujarat and the basic underlying design principal, so that they can be effectively translated into modern designs.

The Kutch region can be divided into three parts running more or less horizontally in an east-west direction. The largest of the three is the Rann in the north extending towards the southeast. Of this the larger northern section is known as the Rann of Kutch and the south eastern part is known as Little Rann.

II. CONSTRUCTION TYPES

Architectural Typologies have developed in the Kutch region as Factor of Tradition, Climate and Functionality. The materials used are locally available materials like Mud, Bamboo, cane cane leaves, of late Bricks, stone etc. Bhungas are traditional houses unique to the Kutch region in Gujarat. The houses are circular walled with thatched roof. According to the limitation of material and construction techniques.

Kutchha Houses

These houses essentially made from organic renewable resources such as mud, grass, cow dung cane etc. The plinth and the foundation consists of consolidated earth with stone and bamboo posts, the walls consists of mud wall, split grass, earth, cane etc., and the roof is thatched, made of wheat or maize straws.

The 'Kutchha houses' have got common forms in Kutch region due to microclimate different and cultural beliefs. The Bhonga is a traditional construction type in the Kutch district of the Gujarat state in India, which has a very high earthquake risk. A Bhonga consists of a single cylindrically shaped room. The Bhonga has a conical roof supported by cylindrical walls. Bhonga construction has existed for several hundred years. This type of house is quite durable and appropriate for prevalent desert conditions. Due to its robustness against natural hazards as well as its pleasant aesthetics, this housing is also known as "Architecture without Architects."

Image 1: Typical Bhungas House of Kutch.

Image 2: Typical Bhungas House of Kutch**.**

These types of houses are mostly circular in shape with mostly one multipurpose room. The plans and sizes of typical kutchha houses same as per limitations of Material and Construction Techniques.
Typical layout of a house consists of Aangan, Room, Cooking area, otta, Verandah, Backyard. The Aangan or Front yard is a public space for gathering, or meeting relatives or visitors.

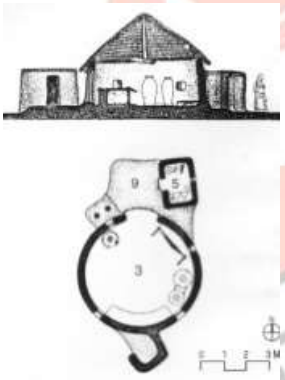

Image 3: Typical plan **Image 4: Pedlo with traditional Bhungas house Furniture**

The house unit is typically defined by the platform- otla – that is always raised above the ground , from a few centimeters up to one meter. The otla define the domain of the home and the place for outdoor activities. On this platform rest various structures composing the household one or more Bhungas (Generally up to three), circular houses with diameter ranging between 3 to 6 meters, covered by a conical thatched roof.

A Typical Bhungas has a door and three or four small and low windows symmetrically arranged around the door. In front of the door and against the wall, lies a low platform, called pedlo, on which traditional furniture placed.

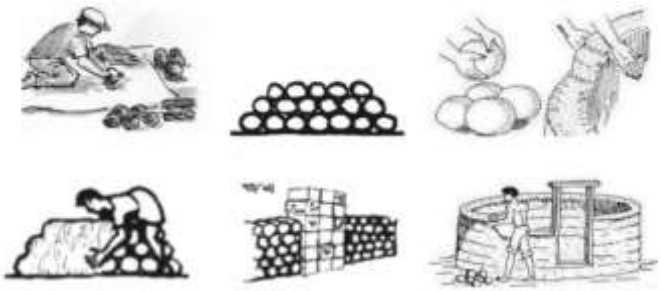

Image 5: Showing the Construction of cob

- Construction Techniques generally used “COB”. In these methods a large Lump is roughly molded into the shape of a huge elongated egg.

- The usual size is anything between 12 to 18inches. 30-40cm long and 6 inches in diameter.
- A row of these cobs of mud are laid nearly side by side. Preferably somewhat pressed together. Then another row of cobs is laid on top.
- When three or four courses have been laid, one above the other, the sides are smoothened over so that the holes and cracks disappear.

Figure 6: Stages of roof construction.

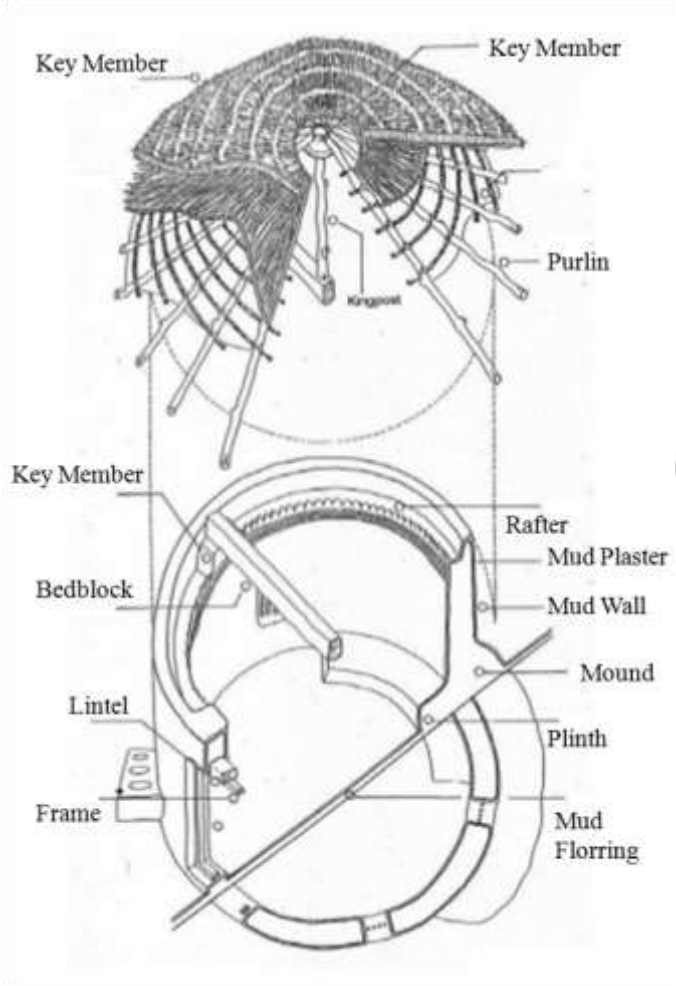

Image 7: Showing the Components of a Bhunga

Figure 8: Structural variant for the roof- supported by a central pillar.

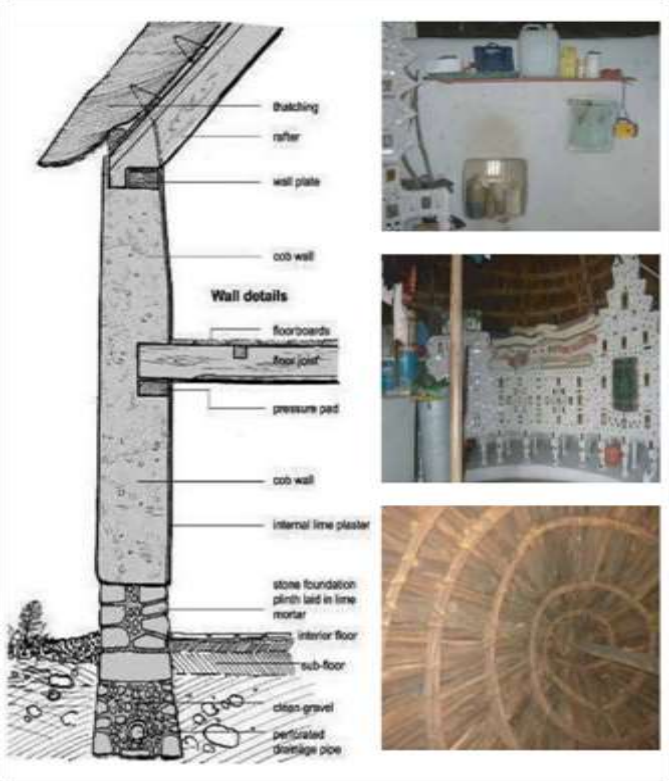

Figure 9: Typical wall section of cob wall

1. The beam- adi is placed horizontally on the wall, perpendicular to the door's axis. The ends of the beams rest on slightly raised portions of the wall and are fixed with pegs.
2. The base- patli- of the vertical kingpost rest on the middle of the beam – adi- the Kingpost stands on the middle of the patli. The cone is fixed on top of the kingpost.
3. The joints (vali) are fixed at the top of the cone and to each other with rope (Kathi) Culms of split bamboo (khapatis) fill the span between valis and are fixed to them.
4. Straw bundles (kheep) are then tied to the roof structure starting from the bottom.
5. A rope's net is then dropped from the top of the roof in order to hold the straw bundles.

Pucca House

These houses are made with stabilized compressed earthen blocks. In Stabilized blocks cements is added (7-8%) to soil in order to produce the blocks in a manual press. The mixture of soil and cement (92-93%) of soil, composed of 75% sand, 15% clays and slit for the remaining portion, to which 7-8% cement is added), is mixed and with this compound the blocks are produced in the press.

Figure 10: Hamlet of Rudramata village

Figure 11: Stabilized Compressed earth blocks Bhunga

They have found place as an advancement of the traditional kutchha houses. According to materials used architectural forms, Pucca houses can be further classified as modified kutchha house.

Modified kutchha houses bear close resemblance with the traditional kutchha houses and are mostly being built in the rural areas these days. They are modified for usage of modern materials in construction. The traditional thatch roof is replaced by wooden understructure with Mangalore tiles cover thereby reducing the maintenance of the roof during rainy days. The construction technique is similar with stabilized compressed earthen blocks with steel rods as vertical reinforcement and horizontal reinforced concrete bands at various levels as seismic safety measures.

Figure 12: Construction of Stabilized Compressed earth blocks at Bhunga

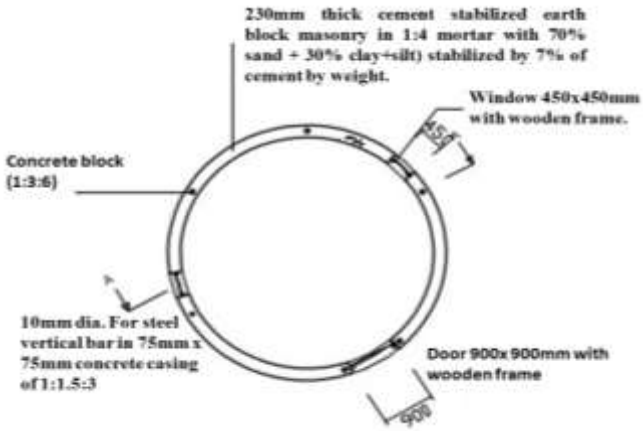

Figure 13: typical plan Stabilized compressed earthen block Bhunga.

III. Conclusion

The architecture of Kutch region relates to the socio-economic setup, the cultural identities and a good climatic responsiveness. A good number of climate responsive design features are revealed during the study of the tr5aditional architecture including temperature control, enhancing natural ventilation, protection from natural calamities such as flood, earthquake etc. However certain features that lack in the traditional housing are mostly fire proneness and termite infestation due to usage of non- treated material and lack of damp proofing and use of non- stabilized soil for construction too pose problems like dampness of walls and washouts during rainfall.

Once the construction and design community of Kutch region are aware of the pros and cons of the traditional typologies, the advanced construction techniques can be meticulously clubbed alongside to nullify the problems and enhance the advantage, a modern yet sustainable architecture for the Kutch region can effectively created.

In view of the varied advantages of the Traditional housing in the various Gujarat states, the Government need to the frame local byelaws that support the traditional houses of Kutch region, and promote incentives to the inhabitants of these houses.

IV. References

[1] Chiara Chiodero, “Earthen habits in rural development of western India:experiences in post- earthquake rehabilitations in kuchchh district of gujarat,” Post graduate school ‘habitat, Technology and Development’Politecnico do torino,Italy, pp, April 2006.

[2] Kulbhushan & minakshi jain, “Architecture of The Indian Desert,”AAdi Centre, Ahmedabad,India, January 2000.

[3] Bhavi vador, “Earth Architecture- Innovation in earth construction and potential of earth construction in contempary scenraio,” unpublished.

[4] Janmejoy Gupta and Shruti Mazumdar, “How Sustainble are Vernacular Dwellings?,” Architecture- Time Space and People, February 2016.

[5] Adam weismann and Katy Bryce, “Building with cob: a step by step guide,”

[6] Amol Gondane and Subhankar nag, “Traditional architecture of north east India,” Journal of the Indian Institute of Architects, December 2013.

[7] Madusudan Choudhary, Kishor S. Jaiswal, Ravi Sinha, “Traditional rural house in kutch region of India,”World Housing Encyclopedia report, June 2002.