Earth Architecture As Sustainable Samples And Its Potential

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ABSTRACT

Earthen material is one of the most common elements of the planet, the most available, the most inexhaustible, the most versatile, the least expensive, and the least harmful to the environment. In today's world, such earthen constructions are the first to be razed and replaced by a generalized type that neither respects the diversity of cultures nor the originality of the material.

However, at the intersection of modern and architecture there are construction techniques from earth in order to keep the authenticity of local settlements especially for poor families.

In this research, it is aimed to search architectural heritae and build it sustainably provided that the protection and maintenance constructions are combined using the earth material and architecture.

This research adopts a set of analytical tools conducive to the study objectives. the research method is divided into two main components:

Firstly, to analyze the ideology component, such as; understanding the architectural concept of the mud house as a life-style; explaining authenticity foundations of the community; reviewing the functional and formal image of earth houses.

Secondly, to analyze the technical component, suh as; understanding the architectural concept of the earth house, understanding traditional earth construction techniques and thinking,

Thirdly, to give earth architecture samples as to reviewing the appropriateness of the earth as building material in sustainable scenario.

To summarize, in this research, to revive earth architecture through the implementation of new project samples with togetherness of modern and traditional fully built from earth and to raise awareness.

Keywords: Earth architecture, sustainability, earth construction, material

1 INTRODUCTION

Earth is one of the most abundant, basic building materials. There are various building that constructed with earth or adobe material. In these buildings ,unfired, untreated, raw earth is used, that is the practice of construction using . It has been successfully used around the world for over 11,000 years, and it is estimated that around half the world's population today live and work in earth buildings.

Used continuously for millennia in most of the world, raw earth remains one of the most popular construction materials. In 1964, anthropologist Claude Lévi-Strauss drew attention to a duality at the heart of civilisations: the use of 'raw' and 'baked'. These are relate to architecture at the same time. [1]

Earthen material is one of the most common elements of the planet, the most available, the most inexhaustible, the most versatile, the least expensive, and the least harmful to the environment. This material builds, at least partially, the houses of more than a third of the World inhabitants[2]

Earthen construction encapsulates many different and varied forms of techniques and applications. As a vernacular solution, it has developed over many thousands of years in all inhabited continents of the world. Eart contruction as a predominant building solution is seen in many rural regions of Africa, Asia and South America. For example, In Morocco, many international attempts were engaged to save earthen structures in some distant villages [3]. These attempts have aimed to restore this heritage, while the real need for us is the re- adaptation of earthen architecture as a building system which is worthful.

Over the last 25 years, the most ancient and construction resources related to earthen construction has grown significantly. Because worldwide research and development work contunue. Scientific articles about earthen construction as a written resouces now appear in leading international journals.

Earthen construction has undoubtedly played a much wider and, arguably, a more significant role than concrete concrete construction.

The oldest, still widely adopted in many countries, uses solar heat to dry and harden earth.Raw earth has many virtues and advantages, in particular in terms of energy saving and ecology.Most varieties of soils can be adopted if they include appropriate granular substances: pebbles, shingle, sand, silt and clay. The three most common for load-bearing masonry are adobe, rammed earth used generally to construct monolithic walls, and its variant used without formwork[4]

The raw material of earthen construction is usually sub-soil material sourced locally and mixed together with water. These material is mixed occasionally other materials such as straw or animal dung.

This mixing provide to form materials ranging from sun-dried mud blocks (adobe), compacted rammed earth, moulded cob. Therefore, with this mixing material decorative plasters is applied to building facade.

Earth is most commonly used where other traditional materials, such as timber and stone, are not available or affordable. Consequently, earthen construction is often seen as primitive and is imagined associated with poverty.

However, there are many celebrated civilisations that are used earthen material such as ancient Egyptian pyramids, large sections of the Great Wall of China, the Alhambra Palace in Granada and the Great Mosque in Djenne, Mali. These buildings are the world's greatest structures and remain to this day.

A number of countries around the world now have national standards or design guidelines about earthen construction. Because some historic buildings needs conserve as authentically approach.

For this reason, The modern techniques devoloped for earthen construction can often find its origins and can be applied to historic buildings aimed conserve. Today, traditional techniques of earthen structures have been relearnt and provided stimulus for new-build applications for today and future. One of them of this developments, is In the search for lower energy (and carbon dioxide) alternatives.Consequently, materials practitioners and researchers have increasingly returned to earthen construction over the past 40 years.

2 ANALYZING THE IDEOLOGY COMPONENT

In earthen architecture, theaccessibility to a good earth material to build homes in very importantant components. Fort his reason, the choice of the location is based mainly on the water criterion. (Figure 1).

Figure 2. ouarzazate morocco, North Africa(most of these villages are settled in a given oasis near valleys) https://www. mediastorehouse.com

2.1 Understanding the architectural concept of the mud house as a life-style

This earthen architectural settlements related with the mentality, culture and traditions of location. This life-style has always been a faith and a code of life and guides a specific life-style that we can easily read outside and inside houses. The founding principles of earthen architecture were basically derived from society's code of life.

- Privacy / Modesty: Narrow streets that enhance the private space are characterictic of earthen architecture. At the same time, central patios which represent "the outside into the inside" represents same idea. (Figure 3,4).

Figure 3. Marrakech arches, Old architecture, Morocco

Figure 4.Morocco 's narraw street (http:// morocco+street+earthen+architecture)

-Respect: Basically, the earthen architecture traces its limits and boundaries. All residential units multiply spontaneously according to community rules and within a total neighborhood respect (Figure 5).

Figure 5. Limits and boundaries of earthen architecture((http://morocco+street+earthen+architecture)

2.2 Explaining authenticity foundations of the community

The authenticity of this architecture remains in perfect harmony between a belief based on the principles of unity and modesty. This approach is a real sustainability in terms of architectural style as well as of community life.

2.3 Reviewing the functional and formal image of earth houses

-Union / Centrality: Earthen architecture houses are built one next to another because of in gathering spaces with a minimum of space connection. This architecture is constructed next to central points that represent functional landmarks like the mosque or the well (Figure 6).

Figure 6. Functional landmarks of earthen architecture

3 ANALYZING THE TECHNICAL COMPONENT

The analyzing the technical component is important issue as to understanding the architectural concept of the earth house, understanding traditional earth construction techniques and thinking,

One of them of techical components is aimed to take preservation measures for earthen architecture.Over the last years, significant efforts have been made in developing earthen architecture through preservation measures.

This progress made this construction sustainable. At the same time, this progress could be inter-linked in many ways to the approach of reintroducing earthen construction and continuity of this construction method. As a tradtional legacy, the tradition of building with earth facilitates promote this important architectural technicality and inspires its future use.

Technically and concerning the urban plan, the compactness of earthen village houses has ideally the requirement of eco-design. Changing economic conditions and shortage of energy must lead to a new evaluation of this historic buisling material. Only 20 years ago, adobe construction was dismissed as impartial or undesirable, because of the belief that it could be used by the very rich or the very poor. However, today, it is taken seriously and accepted as a logical building medium. It must again assume its place as an important, energy efficient building material[5]

This approach, compactness and the qualities of earthen architecture are effective eco-design, and which is necessary for reducing the heat losses in the building. there is a central open patio that acts as a skylight, as a thermal regulator, and which also ensures great ventilation for all interior spaces [6].(Figure 7,8)

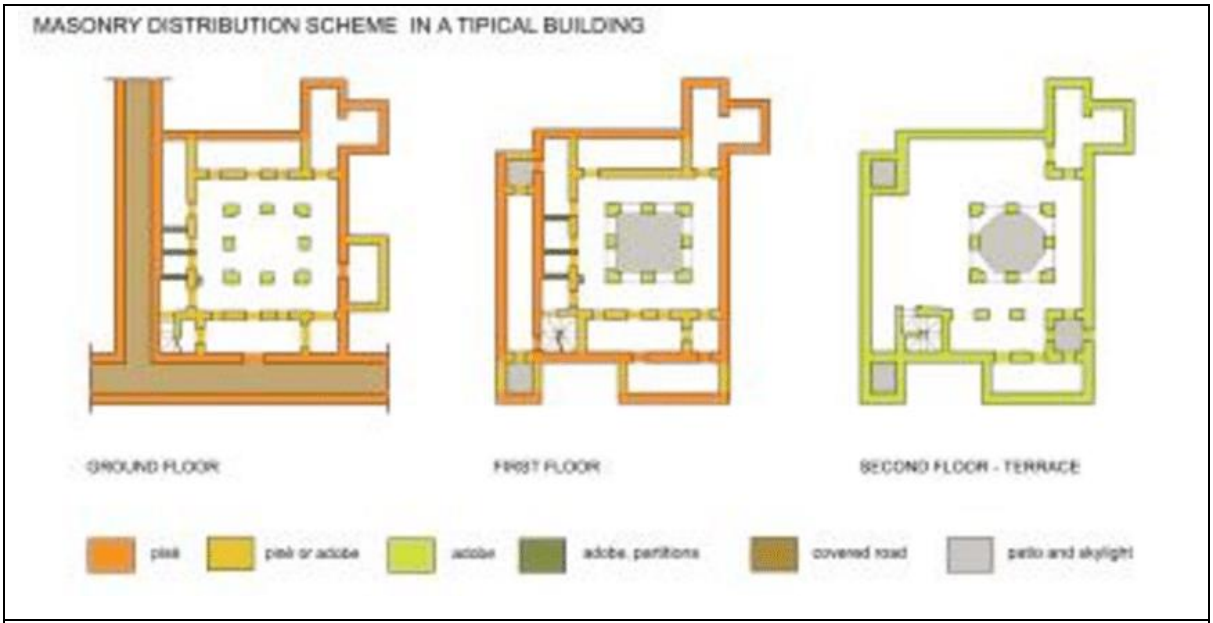

Figure 7. Earthen house typology (http:// morocco+house+earthen+architecture)

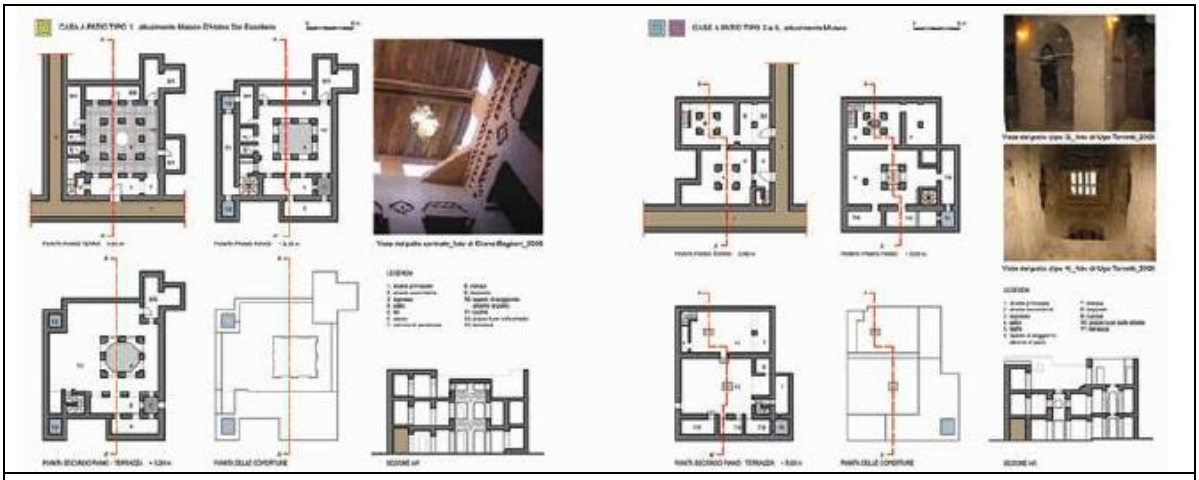

Figure 8. Earthen house typology- inner space (http:// morocco+house+earthen+architecture)

In addition to the design quality of this style of architecture, the characteristic of mud walls grant soundproofing, struggle against heat losses and gives real comfort even in bad climatic site conditions.

The characterics of this material that is 100% recyclable material is a renewable resource with a big potential to be reused without limits. At the same time, earten constructions have therapeutic caharacteric, It is worth mentioning that an earthen construction uses only 3 % of the energy used in modern construction.

In all its forms of earthen construction, it is convenient material during the life-cycle of the building.

The disadvantages of tha material such as low resistance to rain, earthquake, and thermal bridges can easily be treated for a low cost(7). It must not forgotten that in this proces that resistance to rain can be achieved through additives or via a periodical maintenance done by the inhabitants themselves quicly.

The earth material alone, is not an excellent material against great earthquakes because it is not a high pressure resistant material. It has however many high mechanical properties such as a certain deformability under compressive stress and shear. Consequently, earth becomes an interesting earthquake material. Practically, if we want to build in the ground in seismic regions, it is possible to combine it with another material resistant to tension like wood. [8]
But still, earthen material in its various forms and techniques is an excellent sustainable material and respects the environment. It has strong aesthetic value.

4 CONCLUSION

No matter how much considered that, soil construction often considers it substandard. However, adapting and improving the land structure is important conservation of soil surface. In contrary to these critics, It is the dual act of simultaneously "building with the natives" and "building for oneself".

This approach show that historically some traditional cultures have been how environmentally conscious. Especially the necessity of technically adept is seen this construction. This cultural world tradition has social codes ideologically deep and brings a new dimension to "living"

With some notable exceptions, there are a lack of reliable information about the future uses of this natural resource as a locally sourced and ecologically sustainable building material. Remedying this missing knowledge would allow a wide range of architectures to be built in situ, in both emerging and industrialised countries.

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