

# **Using of Traditional Architecture Technology for Poverty Housing Solutions**

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## **Abstract**

Housing means more than the need for a comfortable place to live, but the consumer, with no information on the topic, cannot demand alternative products, he does not know about.

The bioclimatic architecture is the one that takes into account climate and environmental conditions to help achieving thermal comfort inside. It deals with design and architectural elements to achieve that. The bioclimatic house doesn't need installation of complicated and expensive systems, but it just uses traditional architectural elements. There are several reasons to adopt bioclimatic architecture, to save money, to get on better with environment, and to escape from current energy problem.

Many projects related somehow to bioclimatic architecture, have been implemented around the world. So, traditional architecture examples work according to bioclimatic principles, while artificial conditions were unhealthy and expensive. They still stand today on alive, because it has always addressed sustainability.

Traditional architecture is not only an architectural style, it is an attitude towards culture, lifestyle and built form. Spaces always reflect the practical lifestyles of their inhabitants.

It is a continuous and ongoing process, based on the experience of centuries, supported by a spontaneous understanding of the nature, and at the same time it has a sense of community, it's often considered as one of history's elements.

While high-energy consumption, environmental pollution, and profligate use of non-renewable resources are the result of our life style, and it increases the problems of poverty housing, proposals of sustainable built environment constructed with local materials, reflected the core of traditional architecture, can help finding solutions.

The concept of courtyard houses, water and evaporation, shadow and filtration, orientation, using of recycled materials with certain thermal features, as wood and adobe that can be available locally. Nothing of that was existed, by chance, in traditional architecture; it is the way how the inhabitants understand their environment in order to reduce energy consumption. It is the low-cost Sustainable construction in the local language. We can learn from traditional buildings, why certain materials were used, the context of the site and the nature of the inhabitants, the value of living and working in a community and the importance of a healthy built environment. We can analyze those design's examples by contemporary techniques, in order to come up with better and cheaper ways to provide standard sustainable spaces for our communities.

This paper will focus on the lessons learned from the traditional architecture as one of bioclimatic architecture applications, to be implemented at the poverty housing solutions by focusing on three experience (Old Gourna – Egypt, Le Domaine de La Terre - France, Stone building – Syria ),

Why those people chose this style? Which problems they had faced? What was the opinion of local community? What is the real cost of this kind of project? How we can develop this experience? And at the end we will try to answer of the question: can we use the traditional architecture technology for poverty housing solutions?

Architecture can be composed of dynamic / active / flexible / static / passive / inflexible / constant elements. But the process static can give always a dynamic product.

## **Dedication**

To the jasmine of Damascus

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## **Introduction**

Amos Rappaport writes:

“Housing needs to achieve four objectives in order to be successful.

- it needs to be socially and culturally valid .
- it should be sufficiently economical to ensure that the greatest number can afford it .
- it should ensure the maintenance of health of the occupants.
- There should be a minimum of maintenance over the life of the building.”

## **Bioclimatic architecture**

Housing means more than the need for a comfortable place to live, but the consumer, with no information on the topic, cannot demand alternative products, he does not know about it .

The bioclimatic architecture is the one that takes into account climate and environmental conditions to help achieving thermal comfort inside. It deals with design and architectural elements to achieve that. There are several reasons to

adopt bioclimatic architecture, to save money, to get on better with environment, and to escape from current energy problem.

Nowadays we've got the energy problem. For example, electricity, that in appearance clean energy that comes home, is "dirty" in its origin: it is produced in a big percentage by burning fuel (oil, coke, gas), so houses that integrate and cleverly uses environment and climate conditions to solve their needs, could be a bioclimatic architecture in the past and in the future .

Many of projects related somehow to bioclimatic architecture have been implemented around the world. The bioclimatic house doesn't need installation of complicated and expensive systems, but it just uses traditional architectural elements. It works with a sensitivity of regional contexts and the need of users to conserve natural resources. This kind of approach to design shows a rational way for sustainable use of local construction materials and structures in traditional architecture. That encourages designers to respond at the needs of users for healthy and comfort conditions. These design techniques were effective throughout the year, when some other techniques can be useful only part of the year.

## **Traditional architecture**

A lot of traditional architecture works according to bioclimatic principles, at a time in which artificial conditionings are rare and expensive.

Traditional architecture is not an architectural style. It is an attitude towards culture, lifestyle and built form. Do not confuse vernacular architecture with traditional architecture. They are quite distinct from each other. There is also a vast difference between modernity as an attitude and modernism as an architectural style. Modernity as an attitude, can co-exist with tradition. Modernity deals with transformation and change in the present, it tries to incorporate it in buildings. Thus, it keeps changing with time.

Traditional architecture, if interpreted literally, means architecture that has been derived out of tradition, and traditions are the outcome of living practices, daily chores, cultural and social activities. Spaces always mirror the true and practical lifestyles of their inhabitants. So, Traditional architecture is a continuous and ongoing process , based on the experience of centuries, supported by a spontaneous understanding of the nature , it still stands today on alive because it has always addressed sustainability, it's often considered as one of history's elements, at the same time it has a sense of community ,

The spontaneous understanding, creative imagination and the inventiveness of self-taught builders among the people resulted in residences which were exceptionally suitable for life, and the environment.

A special inclination towards nature, adapting themselves to the environment, interacting with the changing tide of human thought and ideologies, all of that can offer the harmony with the surrounding nature.

## **Lessons from traditional Architecture**

The concept of courtyard houses, water and evaporation, shadow and filtration, orientation, using of recycled materials with certain thermal features, as wood and adobe that can be available locally. Nothing of that was existed, by chance, in traditional architecture; it is the way how the inhabitants understand their environment in order to reduce energy consumption. It is the low-cost Sustainable construction in the local language. We can learn from traditional buildings why certain materials were used (usually because they were readily available locally) the science of the materials, the context of the site and the nature of the inhabitants. We can also learn the value of living and working in a community and the importance of a healthy built environment. We can analyze those design's examples by contemporary techniques, in order to come up with better and cheaper ways to provide standard sustainable spaces for our communities.

- **Traditional materials**

While high-energy consumption, environmental pollution, and profligate use of non-renewable resources are the result of our life style, and it increases the problems of poverty housing, proposals of sustainable built environment constructed with local materials, reflected the core of traditional architecture, can help finding solutions from our traditional architecture, building and urbanism, in order to come up with better and cheaper ways of providing good standard sustainable buildings and spaces for our rural areas and cities.

Traditional architecture just uses the regular architectural elements to increase the energetic performance and get a natural comfort.

Traditional materials are all materials that are used in their natural condition, or slightly altered by primary energy, without any industrial influence.

Natural materials by this standard include:

- Wood

- Stone and pebble
- Earth

Using of traditional materials is not the past issues, but can we adapt it to present and future needs?

Natural materials tend to be much more effective than highly processed materials, and have different qualities, due its thermal properties, its mechanical and chemical resistance (Insulation , resistance to fire ), and if we used them correctly with elements from vernacular architecture, such as malkaf , shukshaykha , mashrabiya, they can considerably enhance building performance,

Traditional materials can be always available locally , that gets the job done faster, taking less time to build with fewer people ,we can also save on transportation costs and delivery time .

Advanced materials are becoming critical for today's microelectronic systems. We need be able to determine which materials will be best for our application and how to test for them, develop models for them, and implement them in the product, and have a clear idea about cost issues associated with them .

- **Courtyard house**

The Courtyard House was inspired by an ancient form of architecture as an alternative urban typology; the design of this house is generated by an emphasis on the views and activities of the interior courtyards, where most of windows look inwards.

A limited material palette of stone, masonry and wood is used to express the relationship between exterior and interior. Actually by using the courtyards, we can approach the concepts of skylights, clerestory windows to capture light from above, the sequence of spaces as one walks through alternates between areas of light and shade, indoors and outdoors.

A court or courtyard is a private open enclosed area, often a space enclosed by a building that is open to the sky .these areas in inns and public buildings were often the primary meeting places for some purposes, leading to the other spaces.

Courtyards have historically been used for many purposes including cooking, sleeping, working, playing, gardening, and even places to keep animals. Before courtyards, open fires were kept burning in a central place to allow smoke to escape, courtyard home have been designed and built throughout the world with many variations in every century.

Courtyard homes are perhaps more prevalent temperate climates, as an open central court can be an important aid to cooling house in warm weather, but the comforts offered by a courtyard-air, light, privacy, security, and tranquility - are properties nearly universally desired in human housing .in densely populated areas, a courtyard can provide privacy for family, safe place for children to play. As a way it can provide outdoor space for small communities of people, it managed to create both a sense of community, safety and scale, various levels of private / public gradations.

The grouping of houses around a shared courtyard was common practice among the old history there is a meeting place, where the village related issued discussed.

Courtyards can play a role in the development of today's homes and cities, we generally now use the term courtyard to describe a glass-covered courtyard,

Although courtyard house plans are perhaps more prevalent in temperate climates, the modern courtyard house plan is perfect for any climate, it is a beautiful addition to any location,

- **Orientation**

When we choose a site, we have take into consideration whether primary needs will be for heating, cooling or both. This means that we must take into account, seasonal and daily temperature fluctuations, humidity, hot or cold breezes, geography and surrounding buildings.

Every house needs to have a regards to proper solar & wind orientation, the kitchen should face east to get the morning sun; the living room should face west to get the evening setting sun; the bedrooms should be on the north side where the prevailing winds come from, etc.

Solar access refers to the amount of sun that reaches each area of our home . A good orientation can offer a low-cost building.

The fact the sun is lower in the sky in winter than in summer allows us to construct buildings that capture that free heat in Winter and reject it in Summer. The orientation of the whole building plays an important part in ensuring such a process works.

In simple terms, the way we "put" a building in a plot (orientation , connection with public spaces , correlation with other residences ) , ensures the conditions of balanced sunshine during the day. The objective of an architectural

study is to organize the house plans in a way to ensure desirable sunshine conditions for the various types of living spaces. In this way it is possible to decide the best placement of a specific space so as to attract the best sunshine conditions, taking into consideration the neighboring buildings. One must also take into consideration the direction of prevailing winds.

In the traditional architecture, we can find trees situated in the right places to act as shade & windbreakers too. This architecture takes into account the location of landscape features on the plot ,By correctly doing so, it is incorporating organic architecture at it's finest.

In some area climatic comfort is also ensured by the overhanging roof, which shades the façades.

Since we live in our home through Summer and Winter, we should design it for the entire year. It is important to be comfortable all year long, not just a single season. Sometimes, solar homes are built with large areas of upward, tilted, south-facing glass, designed to catch every bit of sun, Winter or Summer. While tilted glass does maximize heat gain during the winter months, it also maximizes that same heat gain during the summer. If we understand that the rays of sun's high Summer arc will bounce off vertical, south-facing glass and reduce heat gain, we can let nature do the work for us in a passively designed home.

The size of windows comes down to: How 'strong' the sun comes into the room? which side of the house the window is on ?

Passive heating means using winter sun as a source of free heat and keeping summer sun out. The climate we live in will determine the amount of solar access that is desirable.

We can have a low-cost architecture by choosing a suitable orientation .

## **Cases study**

- **OLD GOURNA – Egypt**

Old Gournia is a new town located on a hillside overlooking the West Bank at Luxor. On the main road to the valley of kings .

The old village of Gournia , sit atop as many as one hundred Pharaonic tombs that need to be examined. Therefore, the residents of the old village are

being moved to a new location , in 1946 – 1953 , there was an effort to move the residents of Gournā to a new village designed by Hassan Fathy .he was an outstanding and innovative architect who demonstrated how elements from vernacular Arab urban architecture such as the malkaf (wind catch )shukshaukha (lantern dome ) and mashrabiya (wooden lattice screen ) could be combined with the mud-brick construction traditionally practiced in Nubia in upper Egypt to form a distinctive, environmentally and socially conscious building style that linked the use of appropriate technologies with co-operative construction techniques and the guiding thread of tradition ,  
He trained local inhabitants to make their own materials and build their own buildings, to provide a model for low-cost and sustainable habitat in accordance to the local culture, climate and environment.

Steel, concrete, aluminum and plate glass are materials of modern architecture, they are expensive in the third world ,he believed that we can use traditional materials which could be available locally to have low-cost architecture.

Hassan Fathy exported new ideologies ,after re-discovering the marvels of the heritage , and re-weaving the strings together to generate this new Architecture. He integrated knowledge of the rural Egyptian economic situation with a wide knowledge of ancient architectural and town design techniques.

Climatic conditions, public health considerations, and ancient craft skills also affected his design decisions. Based on the structural massing of ancient buildings, Fathy incorporated dense brick walls and traditional courtyard forms to provide passive cooling. Within the housing, the rooms were amazingly cool and airy because of the use of the traditional materials and the domed design.

Part of his goal was to not just prove that he could build houses cheaper than the supposedly advanced Europeans could, but to solve a much deeper social problem by having the poor villagers build houses themselves, thereby becoming completely self-sufficient. To achieve this he himself trained the locals in the Nubian tradition of mud brick construction. Fathy worked to create an indigenous environment at a minimal cost, and in so doing to improve the economy and the standard of living in rural areas, his architecture is as relevant today as it was 70 years ago .

The structures were cheap, cool in the summer and the walls were heat-retaining in winter. There was fireplaces, chimneys, pigeon roosts and even original bed , and every where there were traditional lamps, marhabeya screens,

domes and colored glass letting silvers of light through .his designs depended on natural ventilation, orientation and local materials, traditional construction methods and energy-conservation techniques. He carried out detailed studies of temperature and wind patterns.

Fathy included an open air theatre, a school, a "Suq" (market) and a Mosque, he also built himself a house in the same spirit of the village, using the same materials.

To Hassan Fathy it was more like the development of a town on a cultural, social level following the regional traditions. Relating to the people and knowing their needs while asking them to participate in the construction of their town was a major part of the project.

Unfortunately, since its construction, this unique architectural achievement has been undergoing serious degradations, the old village was situated on main tourist road to the Valley of Kings, but the new location is about five miles downhill towards the river, Seven thousands locals whose economy depended on touristic trade and on buy local crafts, should leave their homes , but that was not easy task ,because the new location will take them away from the heart of that business.

The reluctance of the people to cooperate in the design and building of the village was mistakenly understood , the people resented the change in order to stay where they were and to continue their own secret ancient trading.

The remains of these villages are worth a visit. His buildings have proven to be very efficient, comfortable, spacious, always based on natural resources and most convenient to hot climate.

For some people Hassan Fathy s works was a Utopias of Mud , and for the others it was a real contemporary Alternative .

- **Le Domaine de La Terre ,Villefontaine**

Le Domaine de la Terre, which is a low-income housing earthen architecture pilot project, built in 1985 in southern France in the new town of Villefontaine. It comprises 65 units organized in 11 groups and designed by 10 teams of architects. 300 people now live in those units. They were all built using earth as the main building material. The project was realized by OPAC of Isere in cooperation with CRATerre

The project was conceived to demonstrate that earth was a very economical and energy efficient building material and also to re-discover the local building traditions. Eighty percent of all houses built in this region prior to 1950 were built with earth. The post World War II thrust to build in concrete had practically obliterated this tradition. This project revived the tradition, helped to create new national construction standards and proved that earthen architecture structures conserve energy better than insulated concrete structures.

The project is a good school for all the actors intervening in the process of constructing our living environment, from materials to the finished object (architects, artists, designers, engineers). It is a place for creativity and interaction and includes the field of earthen architecture.

Three techniques were mainly used to build the houses:

1. Compressed earth blocks
2. Rammed earth (compacted earth-filled forms)
3. Straw-earth mixture that fills the voids between load-bearing members of a wooden structure

Currently it is estimated that one half of the world's population (approximately three billions people on six continents ) lives or works in buildings constructed of earth, in both vernacular earthen construction and contemporary tradition of earth architecture.

We can learn from that projects how we can up-date the traditional methods for new construction, it is a good example for contemporary using of earth in architecture ,

- **Stone building - Syria**

The project is situated in Daraa Governorate , it was the result of one man's mission to improve conditions in his village. Not only did he design the house and raise the funds to build it; he also secured the inhabitants to train each other in building with local materials, and drew on the strong tradition of community solidarity to engage other villagers in the construction of their own homes

Raaif Muhna, designer his own house, he get The Fifth Aga Khan Award for Architecture (AKAA) in (1990-1992).

The Aga Khan Award for Architecture (AKAA) is an architectural prize established by Aga Khan IV in 1977. It aims to identify aspirations of Islamic societies in the fields of contemporary design, social housing, community development and improvement, restoration, reuse and area conservation ,as well as landscape design and improvement of the environment.

To achieve sustainability, the project was based on the principles of designing for climatic comfort with low-cost construction, making the most of local materials and the potential of the local community, and adapting technology from the industrialized world in a simple way. It was also conceived as an exemplar that would raise awareness in the local community of the merits of traditional materials.

The architect used the Basalt , the main natural material that is found in volcanic rocks, Basalt is famous material by its thermal and sound insulation properties, it is suitable especially when resistance to extreme conditions is required.

All the people involved in the project management were native to the village, and the skills learned here will be applied to further initiatives in the village and elsewhere.

Raaif Muhna deals with the heritage as a reference , we learn from its architectural , social concepts, to achieve an example of new bioclimatic architecture .

## **Conclusion**

We can learn from the silent dialogue between tradition and modernity:

- How we can build sustainably by using old techniques in new ways?
- How we can build eco-friendly building systems with low embodied energy?
- How we can built our architectural future depending on our heritage?
- How we start from our vernacular architecture to have a low-cost construction ?
- How we reuse the traditional culture to have poverty housing solution?

Architecture can be composed of dynamic / active / flexible / static / passive / inflexible / constant elements. But the process static can give always a dynamic product.