

The Possibilities of the Actual Orientation of the Green Building in Iraq

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Abstract:

This research covers the zone between Iraq and Iran. The first investigated region is the 'Mesopotamian Marshes' or Iraqi-Iran Marshes, it's a wetland zone located in southern Iraq and partly in southwestern Iran. The other region is a desert district which includes a prominent part of the southern and western parts of Iraq and part of Iran. The last is the center city of Basra. The building materials were the most important building element that affected the conformation of vernacular habitats. In this study, we needed to focus on the effects of ecological and energy-efficiency processes in creating vernacular habitats and the selection of optimal building systems and materials in this part of the world which can be an essential point for sustainable environmental building processes in the future. Reeds, clay, straw, bricks, and wood were the most popular building materials used by builders from this region. The impact of building material on the environment embodies the essential method implicitly significant in this research to effectively determine traditional building materials in the environment in addition to comparative analysis which presents an essential factor of our analysis in addition to the impact of environments on building systems. The main target of this study is to benefit designers and building engineers in their pursuit to find optimal and competent solutions suitable for specific local microclimates using traditional methods in the design process that are sustainable and ecological.

Keywords: Green Building, Marshes House, Basra, Iraq

1. Introduction:

This day and age you hear everyone talking about going green. Whether you want to state it or not at some point everyone will have to follow with the green movement. This is because at the rate we are going the earth is simply not sustainable so we will begin to run out of confident natural resources that are needed in order for us to survive. First we can wonder about

this new traded technology, what exactly is green building? Let's take a nearer look at what it is and what the objectives of a green building are. We are sure to find that it is something that we should take part in (www.businessfeed.sunpower.com).

2. What is the Meaning of Green Building?

First we will take a look at what a green building means. We may think of a green or sustainable building as just a building that doesn't actually have as bad of an influence on the environment as another usual building. Also we may think about it that it's the type of building which contain a wide space of green. The ideal meaning of green building would be

a building project that would permit you to preserve most of the natural environment around the project position while still being competent to create a building that is going to serve a purpose. The construction and operation will support a healthy environment for all involved and it will not disrupt the land, water, resources and energy around the building. This can be the actual meaning of a green building. The U.S. EPA says 'green building is the practice of generating structures and using processes that are environmentally accountable and resource efficient throughout a building's life-cycle from siting to design; construction; operation; maintenance; renovation and deconstruction. This practice grows and supplements the conventional building design concerns of economy; utility; durability; and comfort'. Green building is also recognized as a sustainable or extraordinary performance building (www.businessfeed.sunpower.com).

3. Why Go Green?

Let us take a look at why it is so important to go green. May we will find when going green that we are competent to decrease our carbon footprint and actually lend a helping hand to the environment. We can go green in a range of different ways nevertheless builders and construction workers must do their part as well. Green buildings are planned in such a way to decrease overall influence on environment and human health by:

- Reducing trash, pollution and degradation of environment.
- Efficiently using energy, water and other resources.
- Protecting occupant health and improving productivity.

4. Objectives of Green Buildings:

The goal of green building concept is to improve buildings which use the natural resources to the minimal at the time of construction and operation. Green buildings accentuate on the resource usage efficiency and press upon the three R's - Reduce, Reuse and Recycle (www.ukessays.com). We can achieve the most important goals in these points:

- Maximizes the use of efficient construction materials and practices, increases the use of natural sources and sinks in the building's surroundings, reduces the energy usage to run itself, uses highly capable apparatus for the indoor area, uses extremely skillful methods for water and waste administration. The indoor equipment includes lighting and air-conditioning in addition to all other needed equipment.
- Saving Energy; this can be occurs in two ways: First is decrease in the expanse of energy that is consumed in lighting and air conditioning in addition to other building operations. Second is the usage of energy sources which do not create any greenhouse gases and are renewable in nature. Green Buildings accentuate more on natural lighting and ideas of temperature control and efficient design to more decrease the carbon footprint and reduce cost of operation.
- Saving water; Green Buildings use numerous ways to decrease water usage by treatment and reusing of waste water as well as filter water from sourced from precipitation so to be able to achieve zero water table negative effect from the green building.
- Reducing Waste; it is the most important issues that are to be dealt with. Green Building idea emphasizes on improving the design of the product, re-using and recycling materials. It results in great waste reduction and helps to decrease the environmental effect of the building.
- Improving Health and Productivity; Hygiene and suitable conditions inside the building also help in enhancing human productivity. Green Building idea offers for cleanliness and sound working conditions for employees and other inhabitants (www.ques10.com).

5. Does Going Green Really Cost More?

There are those who think that they just can't go green because it will cost them further money but that is surely a common misconception. Although it may cost you a bit more

to get started when you are going green as green materials and products can be more costly but you really have to consider the type of savings that you will be able to gain. It can be able to save on energy costs because going green also means preserving energy. It should really look at the green building as further of an investment than anything other. An investment that will be capable to save money as well as an investment that will be capable to assistance the environment (businessfeed.sunpower.com).

6. Green Buildings are the Phenomenon of the Times, Where is Iraq from it?

What is the relationship between the outer conditions of temperature, sunshine and rain and the inside thermal comfort is the most important question that needs to be answered (Givoni, 1976). According to a UN document, the purpose of the habituation process is not to build houses but to ovulate a competent house. Also the house should be responsible for the security of technical advice and be involved in acquiring small loans and cheap materials (Stulz and Mukerj, 1981). Climatic conditions constrain the builder to find an efficient solution to assist the human being and the comfort of his animation. Building materials have an essential effect on the home's functions and inhabitants. Environmental building materials enhance assessment to human life and decrease the negative effect on the environment drastically. The main lesson it can be can learned from this study is not only to further the conservation and repossession of the form of habitats already in existence but also to rethink what can form new habitats for the future. This research covers the zone between Iraq and Iran. The first investigated region is the center city of Basra.

The other region is the 'Mesopotamian Marshes' or Iraqi-Iran Marshes; a wetland zone situated in southern Iraq and partially in southwestern Iran. The last is a desert district, which includes a prominent part of the southern and western parts of Iraq and part of Iran (Fig. 1).

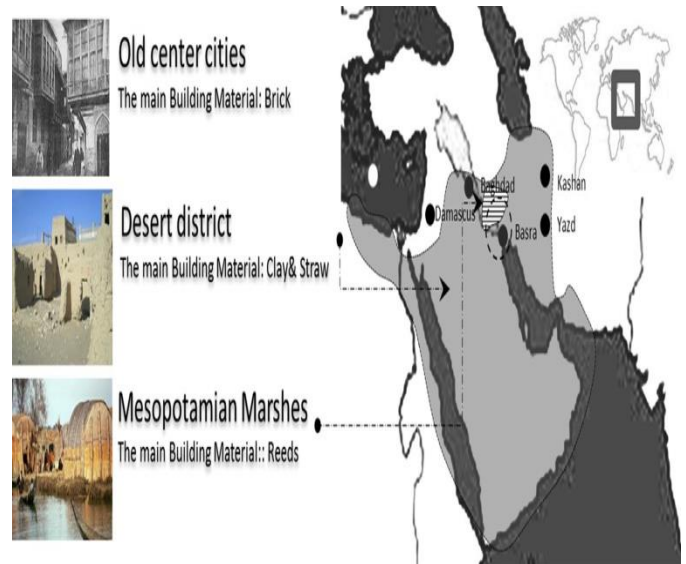


Fig. 1. The different building systems categories from the zone between Iraq and Iran.

The material effect on the environment should not be detected in isolation from other environmental elements. The environmental effect of certain materials or structures can be compared to other elements (Almusaed and Almssad, 2015). Builders from this zone have chosen three varied categories in the building material's selecting process. These materials and their types are as shown the table 1 with their various properties and advantages.

Table 1: The different building materials used in the zone between Iraq and Iran

Building materials	types	properties	advantages
Organic materials	Reeds	Contains a high ratio of silicon substance	1) Has good resistance to water actions. 2) Durable and flexible in technical action and structures; however, it is a highly flammable material 3) Unattractive for insects and other animals 4) An excellent thermal and acoustic insulator material.
	Straw	Consists of barley that is 36% cellulose, 26% pentoses, 17% linen, wax, protein and ash-a	1) High thermal efficiency 2) Excellent insulation properties 3) Straw bales are good at transporting moisture and

		composition very similar to wood	thus regulate interior humidity, provided they bear the diffusion through open screen and coatings
	Wood	The principal components are cellulose (40–50%) and hemicellulose (15–25%), with lignin (15–30%) as well as other material such as sugar, starch and protein	1) Has a high caloric value 2) A natural combination of cellulose fibers (that are strong in tension) embedded in a matrix that resists compression 3) The conversion of wood into a sustainable, renewable resource to be used as a main building material could be beneficial in various areas of the world.
Mineral materials	Clay	Excellent adhesion and bonding forces count as the main properties of clay	1) Principal building material 2) Excellent thermal resistance
	Brick		1) Principal building material 2) Has excellent thermal resistance 3) Very efficient in energy consumption and can be accepted as a bio-ecological material
Mixture material		The density of the mixture building material of clay and straw is 1200–1700 kg/m ³ . A mix of clay and straw is a heterogeneous material, with good thermal properties	Clay is odorless, non-toxic and pleasant to work with in combination with straw, creating a soft to pulpy prepared mix of clay and vegetable fibers (straw) that can be used for filling the panels in timber-framed buildings or pressed in moulds for making clay bricks and boards

In this study we investigated three different cases from Basra habitats as shown in (Fig. 2), where old builders constructed something appropriate for the environmental, climatic and human requirements. These cases are:

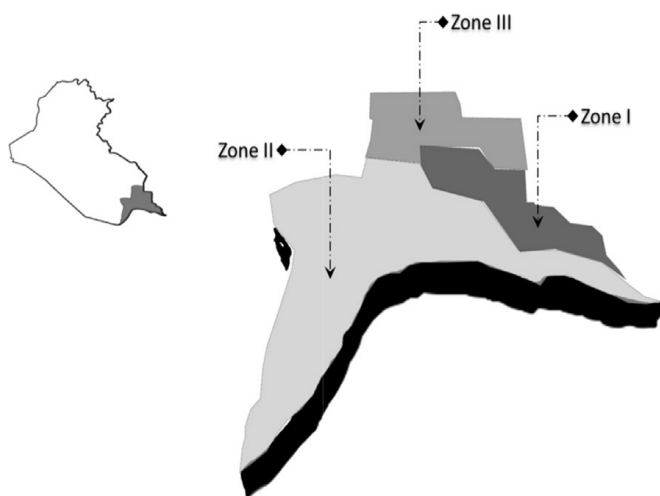


Fig. 2. Building zones from Basra.

6.1 Old Basra Habitat from Zone I

A high temperature 'T' due to the heat island phenomenon is a

main danger factor that affects housing configurations and compositions in this zone. The commendation is to produce a habitat unit that adjusts to great climate with a sequence of interferences such as significant thermal insulation, deep shadows on frontages and natural stream aerations throughout the building functions and structures (Fig. 3). In Old Basra a house is considered attractive if it is spacious and if the condition is airy and exposed on all edges to the wind especially to the northern wind. A healthy house has its courtyards and basins of water. In addition to wooden fragments on the front of the frontage 'Shanashil' (Fathy, 1986). Most of the old Basra featured habitats are decorated which usually to show invisible spirits and to satisfy local civilizations. The habitat area is divided into two efficient zones first a social area that includes the living room, kitchen, storage room, and bathroom and other include a private area that includes bedrooms. Brick is the main material used in this construction. The houses are situated in row buildings in front of a narrow street; placed directly by the old city river. These houses were built in the beginning of the last century. The results expression that the release of CO₂ is relative low.

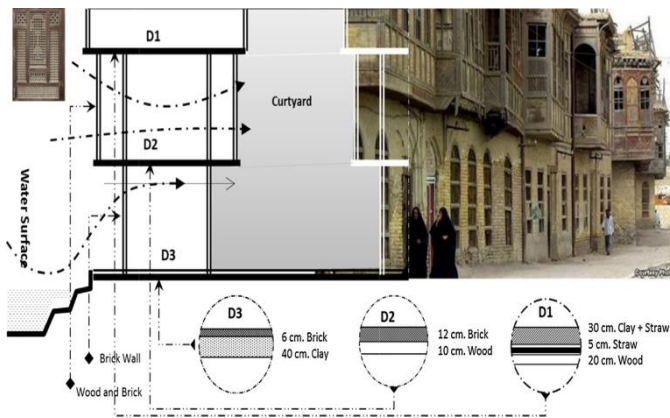


Fig. 3. Traditional house from zone I (Old Basra Habitat).

6.2 Marshes House Unit from Zone II

High moisture 'H' due to marsh water is a chief risk factor that upsets housing configurations and compositions from this zone. Numerous commendations are to create a habitat unit with a building material resistant to water and moisture. The position is a historic site from the Sumerian time. The housing compositions were founded for the early time in the 'Ur' city where the initial settlement was founded (Cooper and Dawson, 1999). UNESCO recognizes this region in the north of Basra as a monument of nature representing it as one of the largest sites of unique ecosystem types in the world. There is a low density of societies living in relationship with impressive flora and fauna full of rare species. In the north of Basra the house was built in water with a weak current and the habitat unit is made of reeds and a mixed of clay and straw (Waltjen et al., 2009). Two ways are to make the island suitable for the construction development; one is choosing good ground and the other is making it meet a particular case. In this region, house is made of lightweight constructions and the main building material applied is reed. (Fig. 4) shows the different procedures for building an artificial island.

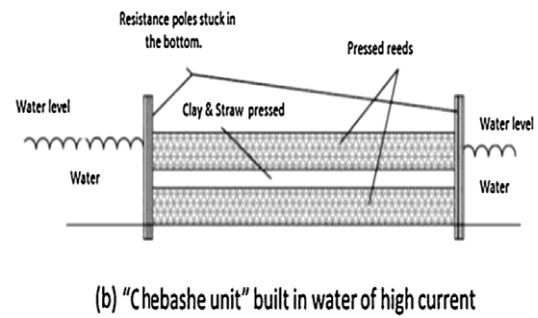


Fig. 4. Different position of artificial island made for habitat unit

The habitat site is created from many posts that include closely related strains of reeds between them. The height of the pillar (Shabe) can reach 10 m. The diameter of the pillar (Shabe) is approximately 70 cm at the base and 20 cm at the top (Fig. 5).

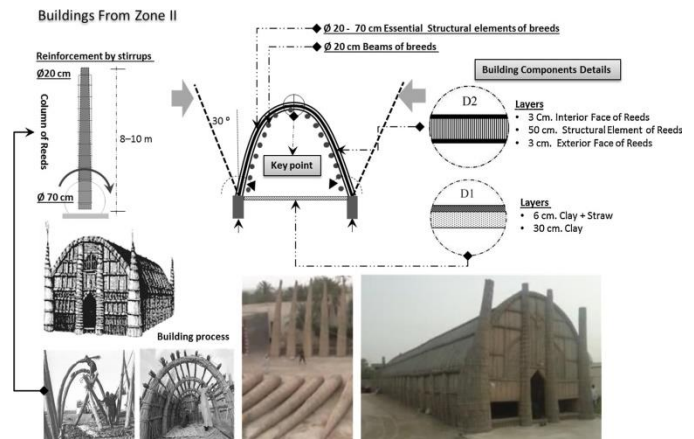
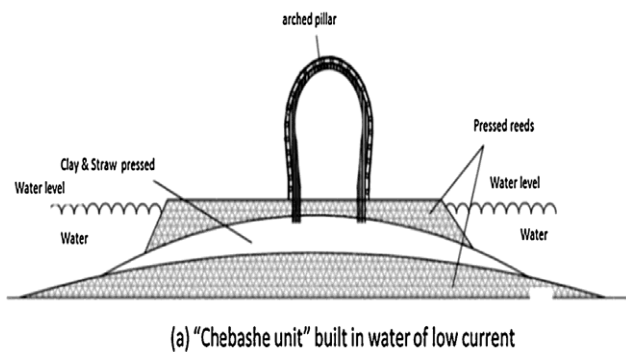


Fig. 5. Compositions Reed's house such principal building materials from northern and Eastern part of Basra.

6.3 Al-Zubeir House Unit from Zone III

Sandy wind 'W' which is due to the Sahara Desert environment in the Arabian Peninsula is a chief danger factor that affects house configurations and compositions from this zone. Here a blind wall is suggested. The earth is the most noticeable material used in natural buildings. Earth can be found everywhere and it used to be said that the majority of the world's population still lived in earth buildings (Keefe, 2012). In fact, concrete and bricks are made of material from the earth but what will be conversed here are structures that are made of earth in its most natural state with a minimum amount of treatment and processing. Strong prevalent sandy



winds aggravate the builder's response: resulting in lower; blind facades; flatter buildings offering less resistance and thus less disposed to building harm and human worry. Practices from the old building process display that flexible building materials can be active when the climate is moist and are rigid when the climate is dry. Generally wet clay is used directly when mixed with Straw and maybe given more body by adding gravel or stone. This is noticeable in areas of the world where earth buildings may have a comparatively short life as part of a nomadic existence. When abandoned they will not leave anything unpleasant behind (Wenzel, 1996). especially on a site where a house is due to be created, The extraction of clay is a zero- carbon solution for construction, the clay, straw walls and floors can be used as a direct substitute for mass concrete (Marchell and Leary, 1974). Al-Zubeir House Units building, in its architecture without architects, summaries that inexperienced builders fitted their work to the local environment and topography. Habitats from an Al-Zubeir district are really vernacular, developing only slightly transformed material from its immediate surroundings. Rural desert architecture is notable for its sculptural shapes achieved in clay. In this zone, the major building material applied is clay and straw. Shade and protection from dust storms may have the highest priority in some areas, ventilation and the trapping of air currents and breeze are the primary considerations (Fig. 6). Then it's noticed that the house material components are environmentally friendly and better employed in energy-efficiency features (Kukreja, 1978).

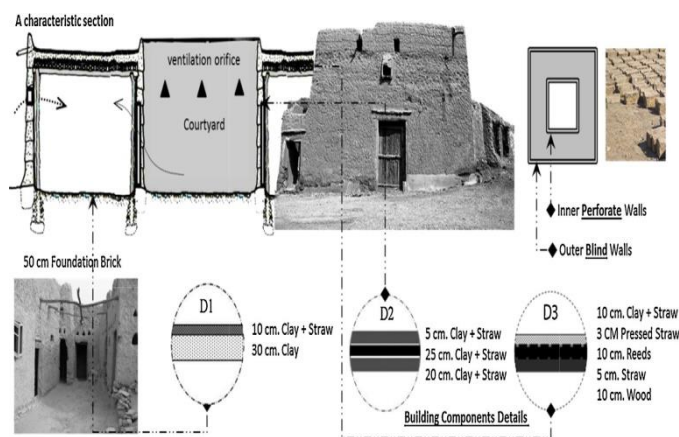


Fig. 6. A compositions clay and straw are main building materials from northern and Eastern part of Basra.

7. Conclusion:

Defining of green building is vary with time and change as people's outlooks and education variations, it is neither easy nor absolute. Furthermore adjusting to a new-architectural awareness with a vernacular conception is difficult for many architects who have been educated in a culture that despises the aesthetics of what they see as twee vernacular cottages. By the way the artistic and serviceable housing opportunities remain innumerable and fun opportunities. Strategies to decrease environmental effects can and should vary depending on the site. The selection of building materials is generally critical because there is little alteration in the material's environmental effects and because they play an animated role both architecturally and in terms of the effect on the external environment near a residential use. For example, the term 'environmentally compatible' submits that suitable effects for humans and ecosystems can still be done with maximum amounts of emissions and limited pollution. This study discusses the requirements of building materials suitable for bio-climatic building in the zone between Iraq and Iran where the meaning of the contemporary building category is an application of the bio-climatic concept which is very difficult. In all places sustainable home thinking about the environmental effects in the overall processes is implied in houses. The zone between Iraq and Iran specifically Basra had three different microclimates: regular hot climate in the city center, a marshland district and desert region. This study tries to investigate an existing habitat in s zone that has different microclimates. The Ecology of building materials is an encounter concerning the possibilities for existing materials and the evaluation of new materials. Yet a complete ecological structure does not be present but a building can always be made more ecological and less environmentally impactful. The main conclusion of the study shows that: The local microclimate directly influences the conformation of habitat so the choice of building materials takes a high priority in the building process. Clay, straw, breeds, and brick are the most commonly applied building materials. These materials were used efficiently in vernacular houses and when insulating habitats, the interrelated environmental impact of the selection of insulation materials is not relevant compared to the savings

in energy. To provision the meaning of the building in the residual value of the primary material, the maintenance and repairs must be carried out on all components corresponding to their specific renewal cycles. For future research the life cycle of building materials by concentrating on the experiences of vernacular houses from this zone should be improved the create a creative interference where advanced material can be used in new buildings with an increasing life cycle of current materials. Brick, clay and wooden structures should be developed to occupy a more extensive place in our residential buildings than they do today. The goal of the study is to assist architects and designers in choosing apposite solutions in terms of building materials. Then the studying of different building materials from numerous sources and their characteristic is necessary to adapt to traditional materials in modern and innovative applications as well as create a good solution in terms of building materials for the studied zone specifically.

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