The Features And Characteristics Of Desert Societies In Spontaneous Oasis Architecture

"A case study of Al-Bawiti Low Surface, Bahariya Oasis"

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Abstract: The Oasis Spontaneous Architecture (OSA)of desert societies has many features and characteristics, whether at the local or Arab level, and it was distinguished by using the simplest natural environmental raw materials, and it also contributed to highlighting the architectural elements which resulted from the human interaction with the surrounding natural elements. And he expressed them in the form of treatments that summarize his thought and believes towards overcoming the nature's forces to achieve the protection from severe weather factors. So that, the study of OSA is must to know the possibilities of the surrounding environment, climatic characteristics and the habits of the community of the desert areas.

The study comes in an attempt to get out of a strategic framework to deal with the OSA, within the concept of preserving the structure of heritage architecture and urbanism, as dealing with these desert communities as a living fabric includes a society in which they live, and an economy based on it alongside urbanism, with its heritage values which is the property of future generations and in order to preserve its special character, the features and characteristics of the desert community and its existing activity aspects must be preserved.

The research deals with the design elements and considerations of OSA and its impact on the natural environment in the "Bawiti Low" in the Bahariya Oasis, to come up with the foundations and standards of planning mechanisms to protect desert communities..

Keywords: The Spontaneous Architecture, Desert Societies, Oasis, Planning Mechanisms

1. Introduction:

The oasis spontaneous architecture has become a true expression of the function, natural, cultural and social environment prevailing in desert societies, and this architecture was able to be compatible with the characteristics of the desert community, by reaching to an architectural and urban solutions which capable of achieving a protection from severe weather factors to reduce as much as possible the exposure to external climatic conditions.

The fused or semi-fused buildings appeared in a random fabric and wrapped around courtyards to provide the largest shaded area and this integration and overlapping of spaces is one of the most important planning and design values for spontaneous architecture, especially in residential buildings in desert communities.This organic planning works to limit the exposure of its various components, such as housing, streets and corridors, to external environmental influences, such as direct sunlight, heat transmitted by radiation, or airborne dust.

According to what mentioned above the spontaneous oasis architecture in desert considered as true reflection of the interaction between built environment and surrounding natural environment, which prevailed in each of the successive historical stages, and from ancient times cities were established on the outskirts of the desert, where the warm environment with its natural and social conditions helped create a society compatible with it.

1.1. Research Problem

Most of the previous studies are analytical studies of spontaneous architecture, to reach the vocabulary that is useful in modern architecture, but in this research the design elements and considerations of spontaneous architecture in desert societies, by identifying cultural, social concepts, values, features and characteristics of desert societies has been studied, also the methods of dealing with planning mechanisms has been analyzed to protect the oasis spontaneous architecture, with its heritage values and the property of future generations, and to preserve its special features and the characteristics.

1.2. Research Problem

Develop a visualization of the characteristics and features of the desert communities in the oasis's spontaneous architecture which takes into account;

- The compatibility of the sustainability principles and characteristics of the oasis spontaneous architecture, culture and social environment.
- Studying the elements and design considerations of the Oasis'sspontaneous architecture in "the Bawiti low surface".
- The planning mechanisms to protect the desert communities in spontaneous and oasis architecture.

1.3. Research Methodology

The research study follows: First; the inductive method in collecting and analyzing information and data from the primary sources represented by the field survey.Second: The descriptive analysis method to study the factors that affecting the formation of spontaneous architecture and urban fabric to be able to define the planning mechanism criteriato protect the desert communities and maximize the interactions with its surrounding environment.

1.4. Research Axes

The research axes consist of three successive axes as shown in Figure (1)

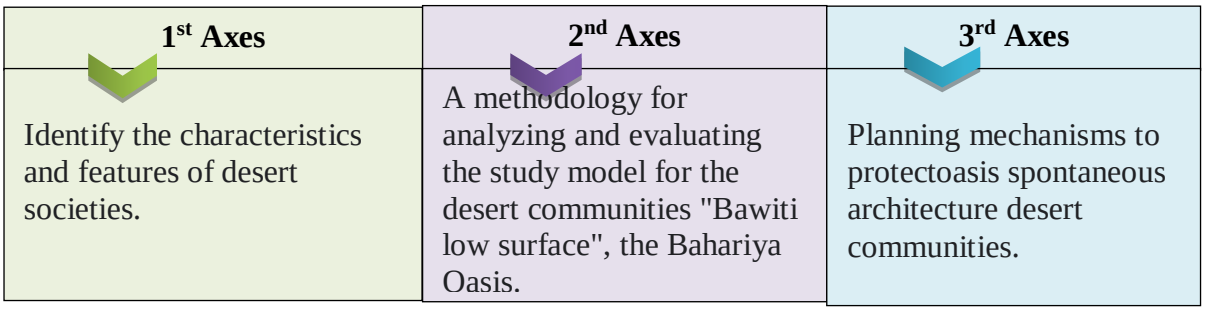


Figure 1: The main research axes

Hence, it is necessary to identify the features and characteristics to realize the nature of change in the desert societies of the spontaneous oasis architecture and know the planning mechanisms to protect the desert societies.

2. Characteristics and features of the desert communities:

Human societies vary in their strength and weakness, while we see that some societies are strong, cohesive, advanced and effective, and on the other hand, other societies suffer from weakness, rupture, delay and underdevelopment, and this is due to various causes and factors, which may differ from one society to another, but in general, there are common factors, pillars and ingredients that contribute to the process of cultural and social construction and the progress of society.

Desert society is similar in rituals and customs prevailing in various fields, as despite the transformations that desert societies have known with the colonial phenomenon and with the "modern state", this did not affect the traditional

institutions such as "tribe and intermarriage" and others, and the presence of the tribe remained and weighed in political and social affairs To this day, despite the transformations that desert societies experienced with the colonial phenomenon and with the "modern state", this did not affect the traditional institutions such as "tribe and intermarriage" and others, and the presence of the tribe remained and weighed in political, social and economic affairs to this day, and despite the gradual spread of the phenomenon of stability in the desert region, this society continued to maintain its traditional organizations, such as "the clan and the family"... and these structures are still responsible for regulating various fields.

2.1. The classification of desert communities

The below table (Table 1) shows the classification of desert communities.

Table 1: The classification of desert communities

Community Unit	The desert society is divided into tribes, then "badanas", then families, and the dominant marriage was first-degree marriage from within the "badana", in order to strengthen the relations that combine blood kinship and intermarriage.
Extended Family	It is the smallest social unit and consists of the father, mother, married sons, their wives and children, unmarried sons and daughters.
Values	The desert community derives its values from "religion and the natural environment." Privacy, segregation between men and women, honoring the guest, and helping neighbors are among the most important customs and traditions of the desert community.
Mores	Ownership and Tenure System Ownership of inherited wells is one of the most important properties that desert people are keen to preserve and develop. ▪ Public ownership: the market square area is a right for all without any difference in tribal affiliation. ▪ Sole proprietorship: It is for agricultural lands located next to the well, the exploitation of which is linked to the presence of a water share for its owner. ▪ The division of labor 's System: women have women have housework and children's education, while men work in agricultural activities and clearing wells, and the institutions responsible for power and governance are tribal elders.

2.2. The features and characteristics of desert societies effect on the spontaneous architecture of the Oasis

The features and characteristics of desert societies in spontaneous oasis architecture throughout the ages are a true reflection of the civilized environment, which prevailed in each of the successive historical stages. The hot environment, with its natural and social conditions, helped create a certain pattern compatible with it, in addition to directing the person to design inside, whether it was for the neighborhood or the dwelling or in the city as a whole to providea protection from climatic conditions.

The oasis architectural formations appeared at the planning level in an organic form, without prior association with specific formative or architectural considerations. Thus, the oasis architecture has become a true expression of the function and the natural, cultural and social environment.

This architecture has come up with architectural solutions that protect the buildings from the harsh weather factors in the desert communities. The fused buildings and other influences on the urban fabric and the architectural character of those desert areas have been appeared [1]. (Figure 2)

Figure 2: The effect of the hot environment in creating the oasis architectural style of the desert community.

2.3. The Oasis spontaneous architecture

Oasis spontaneous architecture is seen as one of the important areas in desert societies, as cultural elements that are physically and culturally linked to humans, and it is considered an expression of the prevailing culture in general and the culture of the desert in particular. The Oasis spontaneous architecture performs a symbolic function that cannot be neglected in the field of architecture, as what a person builds is not only related to the aesthetic aspect, but also is related to the person, his years of life and his behavior [2].

The spontaneous architecture is the architecture that is completely linked to the environment and the prevailing culture, where the interaction between the building and its occupants takes place, and is characterized by the innate taste stemming from the human environment.

The house that a person builds in an area to protect against environmental conditions is a cultural adaptation.It may be built of leather, wool, or wood to insulate it from the cold, or bricks and mud to insulate it from heat, and both types are depended on the principle of insulation. The shape of the house also gives a protection from natural conditions, which helps to adapt, as the people of the oases realize that they are part of nature, and therefore they built their homes in a way that is consistent with the environmental and climatic conditions.[3]

2.4. The importance of Oasis spontaneous architecture

Oasis architecture is characterized by complete harmony with traditional architecture, which means total interaction with the desert community, it includes a value that is not available in modern construction, such as compatibility with nature and economy in materials, and it is closely linked to the cultural, social and environmental context.The housing design in the local community is an expression of the local knowledge about how to build the housing in accordance with the environmental conditions.

3. Compatibility and sustainability of desert societies

The concept of sustainable compatibility has been present in the desert community's way of life, as the surrounding environment was the source of their lives, and therefore they did not use the term sustainability as an expression of their way of living and constructing, but rather they lived the concept and applied it spontaneously. Where their interaction with the surrounding environment and the optimal use of natural resources, part of ensuring their survival on this land and adapting to difficult conditions, such as the harsh climate therefore, sustainability for them was spontaneous and spontaneous. [4]

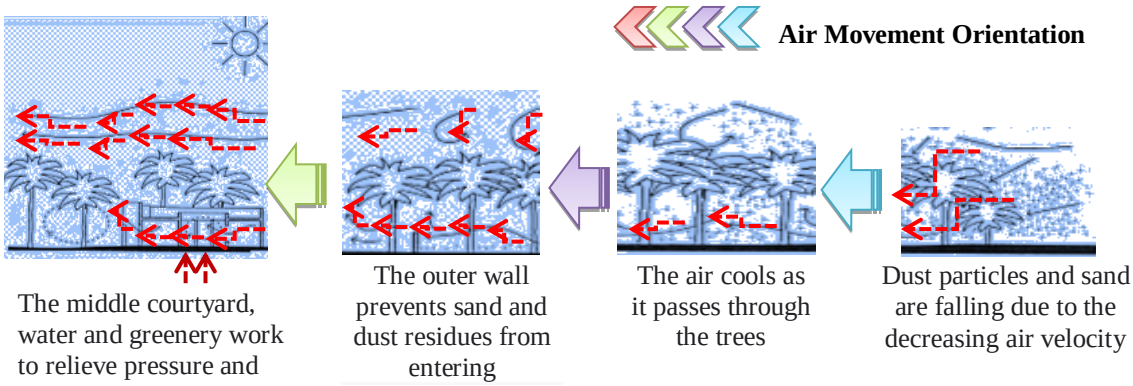


Figure 3: Optimum utilization of natural resources and adaptation to difficult conditions in desert communities. [5]

3.1. Principles of sustainability in the desert communities planning

The desert communities, with their spontaneous integrated fabric, are the best example of sustainability concept application at the level of those regions as a whole where, the planning of desert regions and communities and the treatment of movement paths in terms of width, shape, length, direction, and change of direction represents the basic stage of adaptation to the environment.

The compact fabric of these desert communities moderates its climate effects, such as; high temperatures, solar radiation and hot dust-laden winds, which works to reduce the total heat load that affecting the facades of buildings, especially residential buildings, as it considered the largest structural ratio in the total construction production in desert communities.Some cities were distinguished for their planning treatments, such as the city of Ghadames, Libya, as it considered as the most shaded arcaded alleys with openings for lighting and ventilation, which creates areas of high pressure, and others of low pressure, and thus helps to create a natural air movement that mitigates the severity of the hot, dry climate that characterizes the desert areas of North Africa (Figure 4). [6]

Figure 4: The Organic compact urban fabric for Ghadames City, Libya (Left) – The shaded arcaded alleys with openings for lighting and ventilation (right) [5]

4. "Al Bawiti Low Surface" as an application for the spontaneous architecture of the Oasis.

The research reviews the study of the current situation of the "Bawiti Low Surface" and the impact of natural and heritage resources on it also, analyzes the elements and design considerations of spontaneous architecture and its impact on the natural environment, to reach the considerations and standards of planning mechanisms to protect desert communities.

4.1. Reasons for choosing the study area "Bawiti Low Surface"

As the Bawiti Low is the administrative capital of the Bahariya Oasis, and one of the areas in which the urbanization pattern is most prevalent, and it is located in the middle of the urban extension of the Bahariya Oasis. Al Bawiti Low has been known as a city according to the administrative function that it performs, as it contains the main government departments, and the heart of "Bawiti" city has been penetrated by the main regional transport road, which is the main cause of its overcrowding.

4.2. The studying Methodology

The case study analyzing methodology will be as the following in (Figure 5).

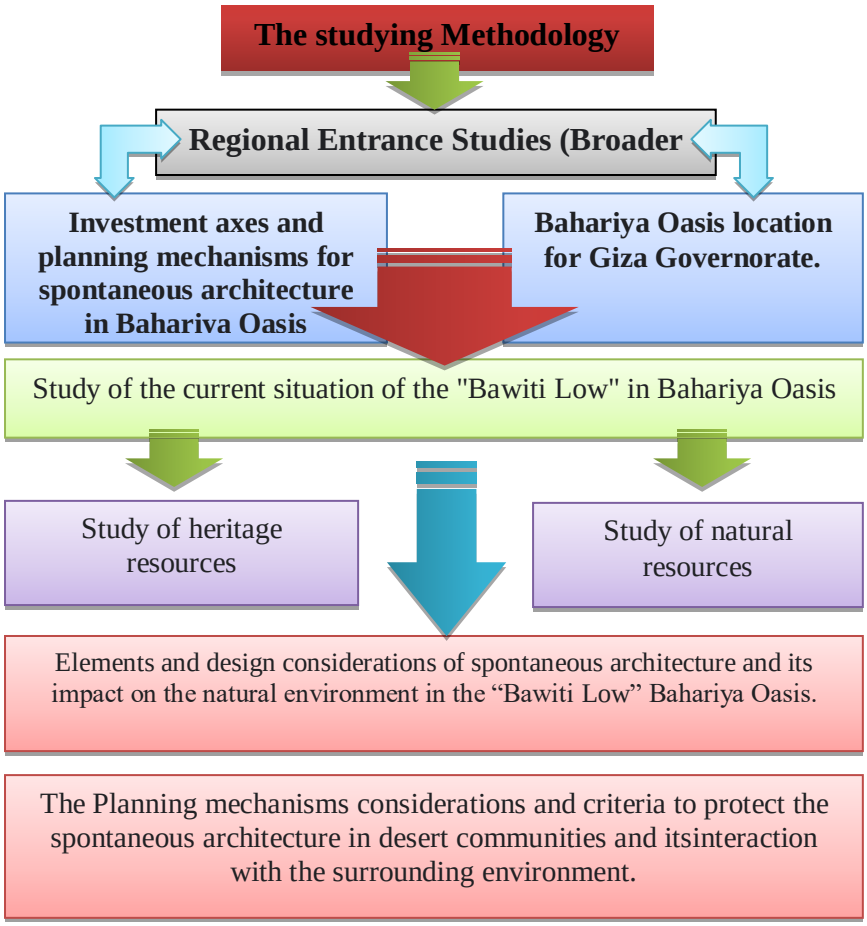


Figure 5: The studying Methodology

4.3. The location of Bahariya Oasis for Giza Governorate.

Bahariya Oasis is one of the Western Desert's oases in Egypt. It is located on an area of 360 kilometers southwest of GizaGovernorate, and one 180 kilometers west of Assiut Governorate. The Bahariya Oasis is located on a Low

Surface that covers more than 2000 square kilometers. The current population of this government is about 30000 people (Figure 6).

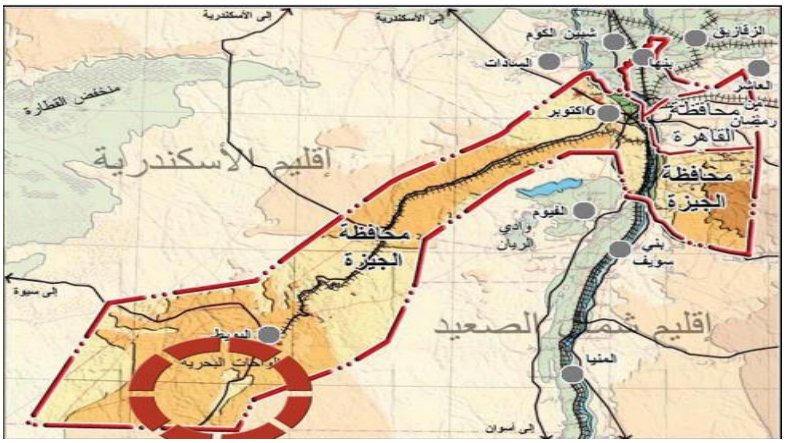


Figure 6: The location of Bahariya Oasis in relation to Giza Governorate (6th of October Governoratecurrently) [5]

4.4. The investment axes and planning mechanisms for spontaneous architecture in Bahariya Oasis

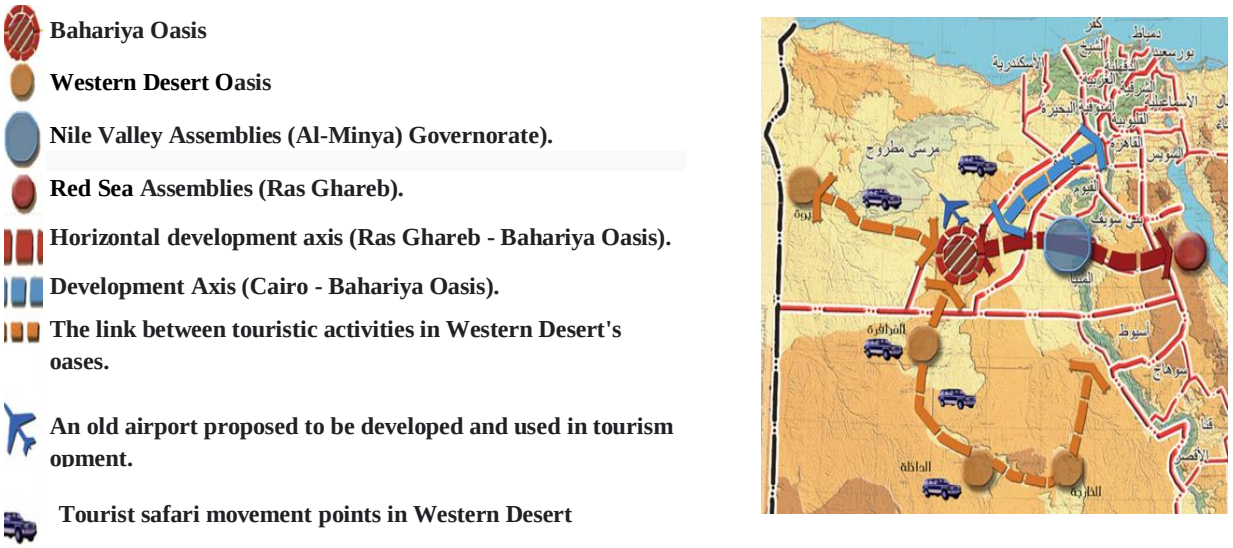


Figure 7: Bahariya Oasis's investment axes and planning mechanisms for spontaneous architecture in Bahariya Oasis. [5]

4.5. The studies of "Bawiti Low" current situation and identifies the natural resources in this area (Figure 8)

The Following Figure (Figure 8) and table (Table 2) identify the The current situation identification of natural resources in the study area "Bawiti Low", Bahariya Oasis

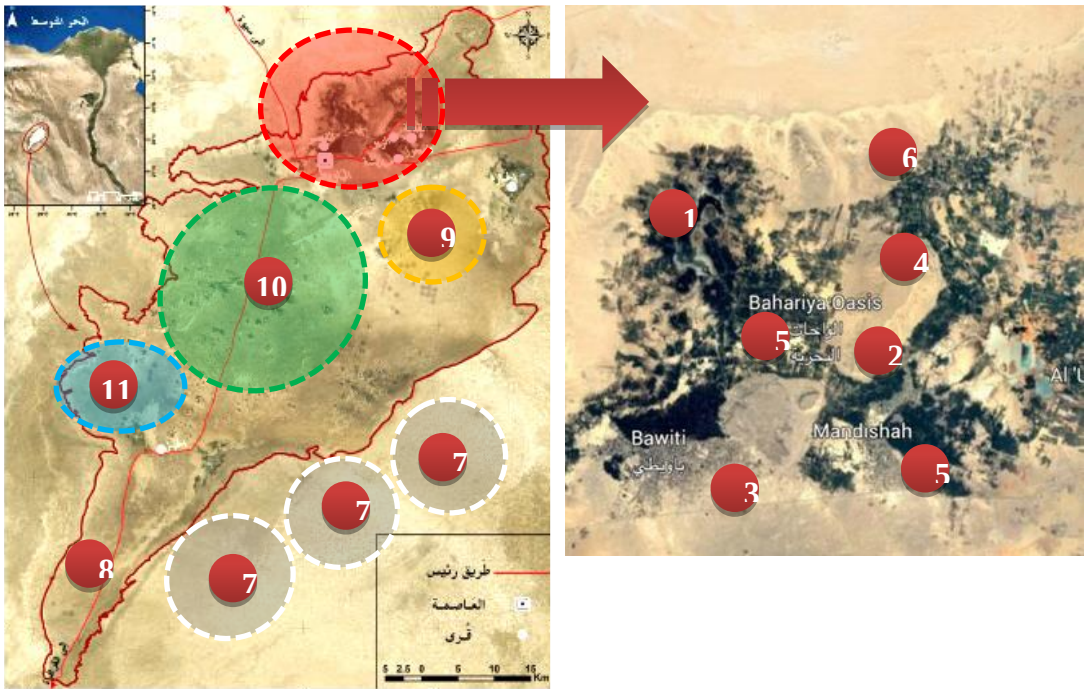


Figure 8: The current situation identification of natural resources in the study area"Bawiti Low", Bahariya Oasis [5]

Table 2: The current situation identification of natural resources in the study area"Bawiti Low", Bahariya Oasis

Oasis Areas 1	There are abundant lakes in Bahariya Oasis, but most of them are seasonal lakes, except for Al-Mamarur Lake, where its depth reaches 3 m and its width varies between 250-300 m. 	**Dinosaur valley Area** 6	Where the remains of the largest dinosaur in the world were discovered near Al-Dust Mountain.
Wells and Water Eyes 2	Bahariya Oasis is known for its abundance of wells and therapeutic water eyes, as it reaches 295 therapeutic sulfur wells, such as; the Pishmo well and the forest well, most of these wells are used in agriculture. 	**The White Desert** 7	An area with natural limestone formations, which extends to the Farafra Oasis, and it is administratively affiliated with it. It represents an open museum of natural and animal-like formations. 

Mandisha Mountain 3	It is located between the village of Mandisha and Al Bawiti, it has a black top, and it is called the English Mountain, because the English army was stationed there during the Senussi war. 	**Crystal Mountain** 8	It is considered one of the touristic destinations in Bahariya Oasis. It is administratively affiliated with Farafra and characterized by minerals and diamond luster. 
Al-Maysarra Mountain 4	One of the mountains with black tops, where is the safari sports lovers go, and is located below the forest well and the airport. 	**The Red Desert** 9	It consists of iron oxides, which is red, and it is a destination for safari tourism. 
Palm Trees Area 5	The number of palm trees in the Bahariya Oasis is about 500000, as the main activity of the people of the oasis is agriculture. 	**The Black Desert** 10	Bahariya Oasis is famous for its Black Desert, as it is made of basalt and iron quartz rocks. It is spread in the south of the oases and on the tops of the mountains. 
The Magic Eye Area and Al-HaizLake 11			

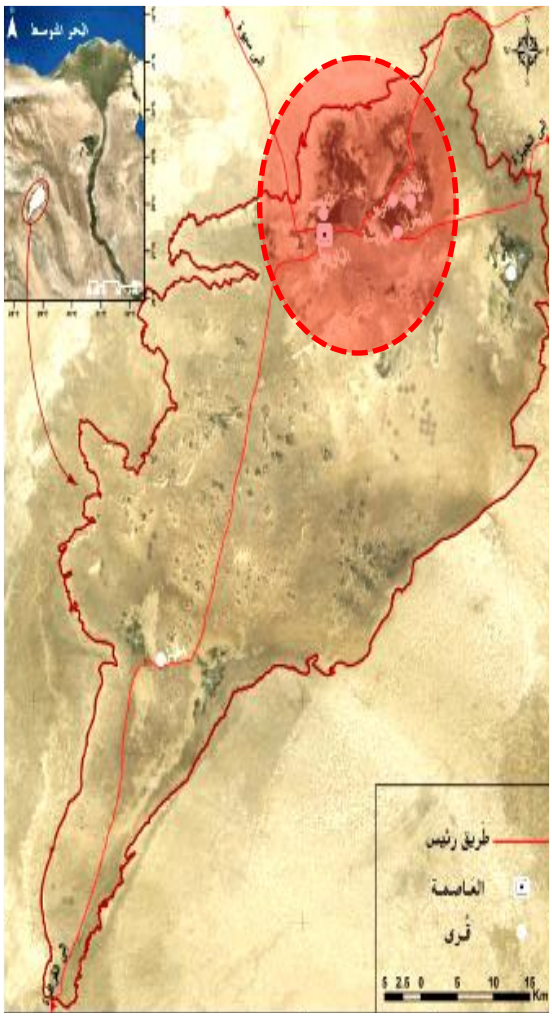
4.6. The Heritage Resources of "Bawiti Low", Bahariya Oasis

The Following figure (Figure 9) shows the main heritage resources in Bawiti Low.

Al- Bawiti Mosque

Al Senosy Mosque and Small Praying Area

The Temple of Alexander the Great, located in the northwest of the



The Valley of the Mummies and the tomb of the Bahariya Oasis ruler, which consists of mummies with golden masks on the faces of the mummies.

The tomb of Bentabui and contains mummified birds.

Ain Al-Maftala Temple, a pharaonic temple.

Figure 9: The Heritage Resources of "Bawiti Low", Bahariya Oasis [7]

4.7. The studies of "Bawiti Low" current situation and identifies the natural resources in this area

- Construction materials: sandstone, limestone, basalt rocks, and mud bricks, which were used to build their homes, in addition to the "Karshef" material, which is one of the materials that appear on the edges of the "sabkhas". All of the mentioned materials are resources from the local environment (Figure 10). [8]
- Housing construction materials: It is made of mud bricks, where sand is mixed with mud, and the wall's thickness varies between 50:70 cmto isolate the inner spaces from outdoor high temperature.
- Roof construction materials: It is made of palm tree trunks or trees scatteredand covered with palm leaves.
- House's doors: They are designed to be a single piece that allows the entry of crops and animals inside the house. [9]

Using natural material in traditional rural housing construction

Using palm leaves to cover the houses roofs

Using "Karshef" material in traditional rural housing construction

Figure 10: The natural Resources usage in the case study "Bawiti Low" [5]

Despite the importance of building the roof with wood and palm fronds, and the walls with mud bricks to maximize the thermal insulation and creating a better climate inside the house, many of these old houses suffer from a bad condition, in terms of corrosion of the building material and the destruction of its parts as a result of being affected by weather factors, and the passage of a long period of time On its construction, the people nowadays build and restore the dilapidated parts with modern materials, or completely demolish the house and rebuild it in the modern urban style and ignoring all the benefits of the surrounding natural materials.

5. Elements and design considerations of spontaneous architecture and its and how it affectedby the natural environment in the "Bawiti Low" Bahariya Oasis.

The spontaneous architecture's constructed buildings in the "Bawiti Low" consists of a group of buildings with height of one to two floors and sometimes it reached three floors, these buildings are interspersed with some narrow, closed-end streets, as well as closed inner courtyards, and from time to time these buildings are connected on the upper floors to be like a single block of buildings.The area of these buildings is much larger than the area of the spaces that permeate them, whether these spaces are internal yards or external streets and squares (Table 3). [10]

5.1. The general traditional house model in the "Bawiti Low"

The traditional house includes one or two inner courtyards surrounded by rooms on more than one side, in addition to an open courtyard in which the service elements are assembled. The courtyard may be located at the back of the house or at one of its sides.

The house often consists of two floors, and this model is repeated in the designs of small or large residential buildings, In general, the House consists of three main axes as shown in (Table 3)

Table 3: Bawiti low traditional house contents

The first axis: The reception and hospitality section (Figure 11)	The second axis: Living rooms (LR)and bedrooms (BR) section (Figure 11)	The third axis: Services section(Figure 11)
It consists of a room called the "Mandara" and it is separated from the other rooms with direct axisto entrance to achieve privacy, and also it takes into account the service on it from inside the house. The reception room should be ventilated through openings	It consists of bedrooms and living rooms in addition to storage rooms, it has a private entrance, and it is often wrapped around an inner courtyard. There are also bedrooms and living rooms on the upper floor for summer use. There is no direct connection	The service elements consist of: the toilets, the kitchen, food serving room, the date saw, and a place for the farm animals to sleep, and all of these services are gathering in their own back yard. The services contain its own entrance that leads to a side street

overlooking the outside, or through openings overlooking the inner courtyard.	between the living rooms and the reception rooms, except through the entrance space or through a door that leads to an inner courtyard for the reception rooms.	and it is connected to the inner house spaces through an entrance from inside the house.

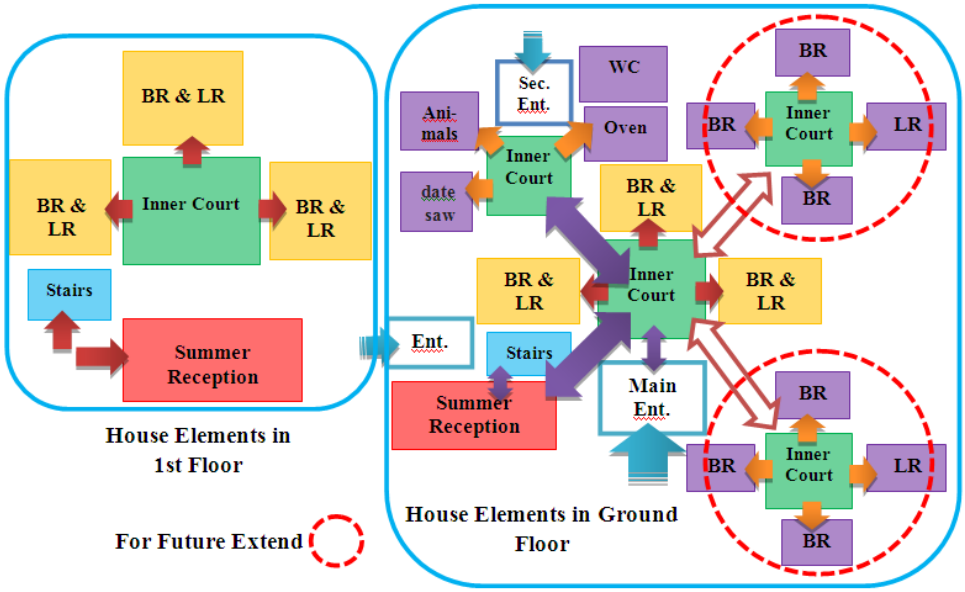


Figure 11: The "Bawiti Low" traditional house's zoning

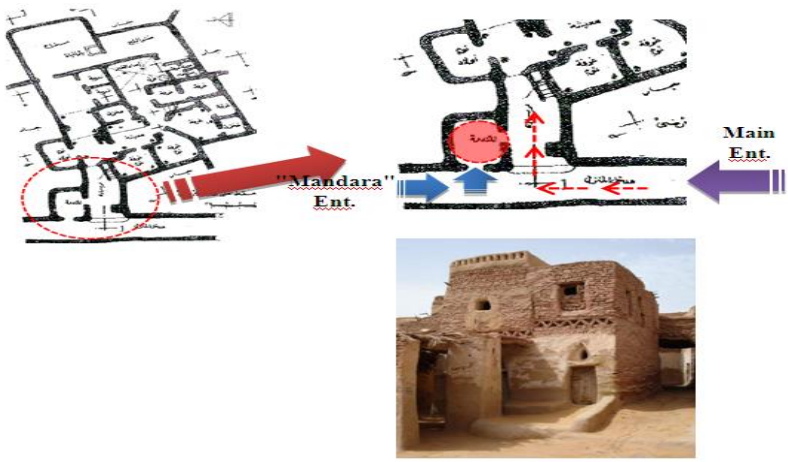
5.1.1. Main elements of traditional house in "Bawiti Low"

The traditional house consists of five main elements as the following;

First: Entrances

The houses are connected to "Bahariya Oasis" through the streets overlooking it, either through one entrance or two different importance entrances. (Figure 12)

- The main entrance: It is a large space used by the house's resident and visitors, where it is twisted or broken at a right angle from the main path to isolate vision and provide privacy, and it is directly connected to the "Mandara".
- Reception "Mandara" Entrance: It is a private entrance to "Mandara" only and directly connected to the main street to ensure privacy



The location of the entrances varies from one house to another, as they either overlook the main lanes, or they are in closed lanes far from the sight of passers-by and sometimes they are roofed, in order to provide protection from the sun's rays in these areas, and it is taken into account that the entrances are not opposite to provide privacy. [11]

Figure 12: Ground floor for a traditional family house - showing the main entrance and the "Mandara" entrance [5]

Second: Reception area "Mandara"

It is considered an essential element of the home in Bahariya Oasis, through which the various social activities of the family are performed, such as wedding celebrations also it used sometimes as a prayer room for family members and its internal walls are also used to make gaps that are used as wall cupboards.

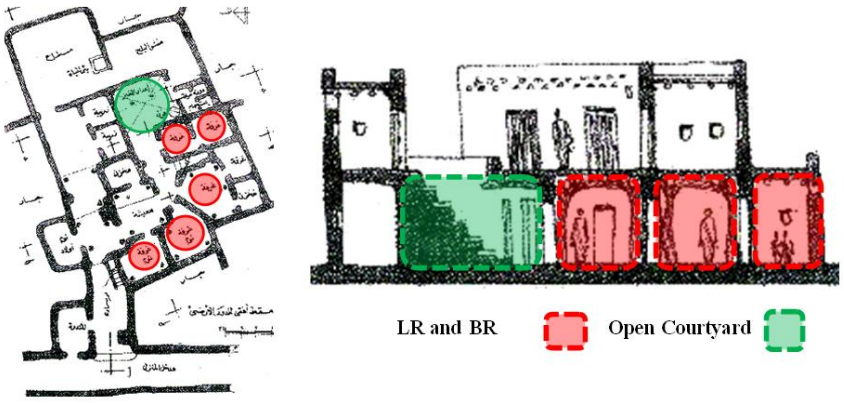
"Mandara" is a rectangular room that is often characterized by a larger surface and a higher ceiling than the rest of the rooms of the house. It is always located at the front of the house in a place isolated from the rest of the house elements, and is accessed either through a private entrance overlooking the street directly, or through the main entrance space through its own door, and sometimes it has another door that connects to the rest of the house.

The ventilation of the "Mandara" is through high openings in its walls that open to the outside, or through low openings that open to its own inner courtyard.

Third: Living rooms and bedrooms

The houses in Bahariya Oasis are characterized by its diversity in the form of living spaces and their multiplicity, and it is called the "Mashraa' ", (Figure 13) it is divided into:

- Rooms on the ground floor which used as living rooms in summer, and they are called "summer's Mashraa' " where its thick walls and ceilings help to protect from the sun's rays
- Rooms the upper floors and roofs which are called "winter Mashraa' " and it used to sit and enjoy the sun's rays during the day in winter and I summer it used to enjoy the fresh air at night as itis well ventilated.



Most of the houses in Bahariya Oasis contain summer bedrooms located on the ground floor and winter bedrooms located on the upper floor. The bedrooms and living rooms are often gathered around private courtyards in large houses, which include several families and each family has a part of the house, and it is made of leaves and covered with mats, in addition to the terraces that are built with mud next to the interior walls, and they make recesses in them to store their clothes and tools. (Figure 13)

Figure 13: Ground floor showing LR and BR (Left) – Cross section showing the summer LR & BR (Right) [5]

Fourth: The inner courtyard

The inner courtyard is considered as one of the most important basics in the house's design in desert areas, as it is one of the architectural solutions that used to reduce the effect outdoor climate on the inner spaces.The inner courtyards considered as a mediating and regulating factor between the internal man-made environment and the external natural environment surrounding it. (Figure 14)

The oasis houses consist of an open inner courtyard or several small courtyards surrounded by the main elements of the house, in addition to a backyard which collected the service elements.

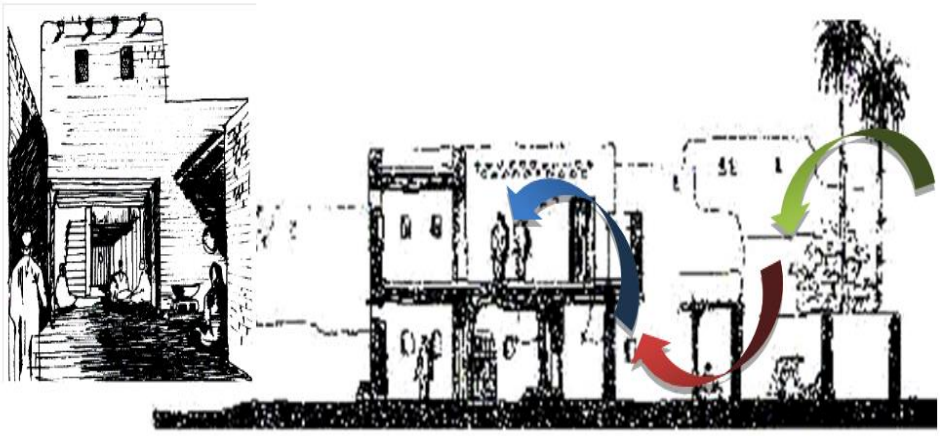


Figure 14: Cross section showing how the inner courts reduced the effect outdoor climate on the inner spaces [5]

Fifth: Services

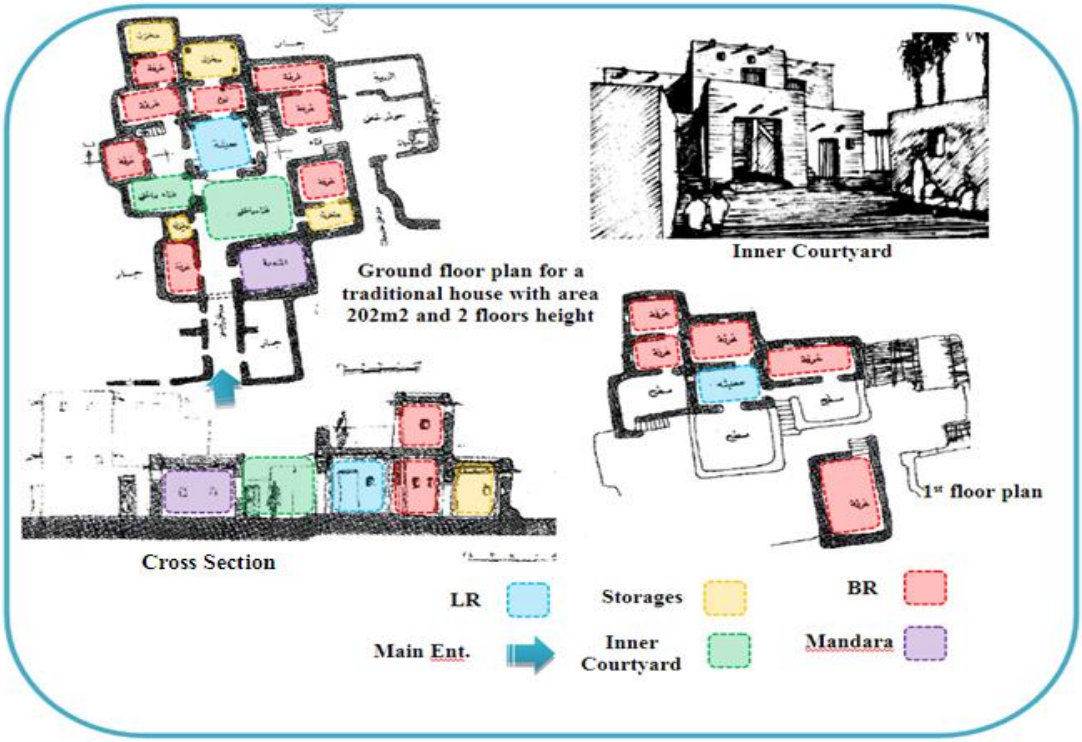
The traditional house of the oases contains some complementary elements that serve it, and these elements are gathering around an open yard located either at the end of the house or on one of its sides. (Figure 15)

Figure 15: Cross section showing the service area in one of the traditional house [5]

5.1.2. Some models of the traditional Houses in the "Bawiti Low" in the Bahariya Oasis.

The following figures shows two different examples of the traditional houses in "Bawiti Low" (figure 16, 17)

Figure 16: First example of Traditional House in "Bawiti Low" [5]



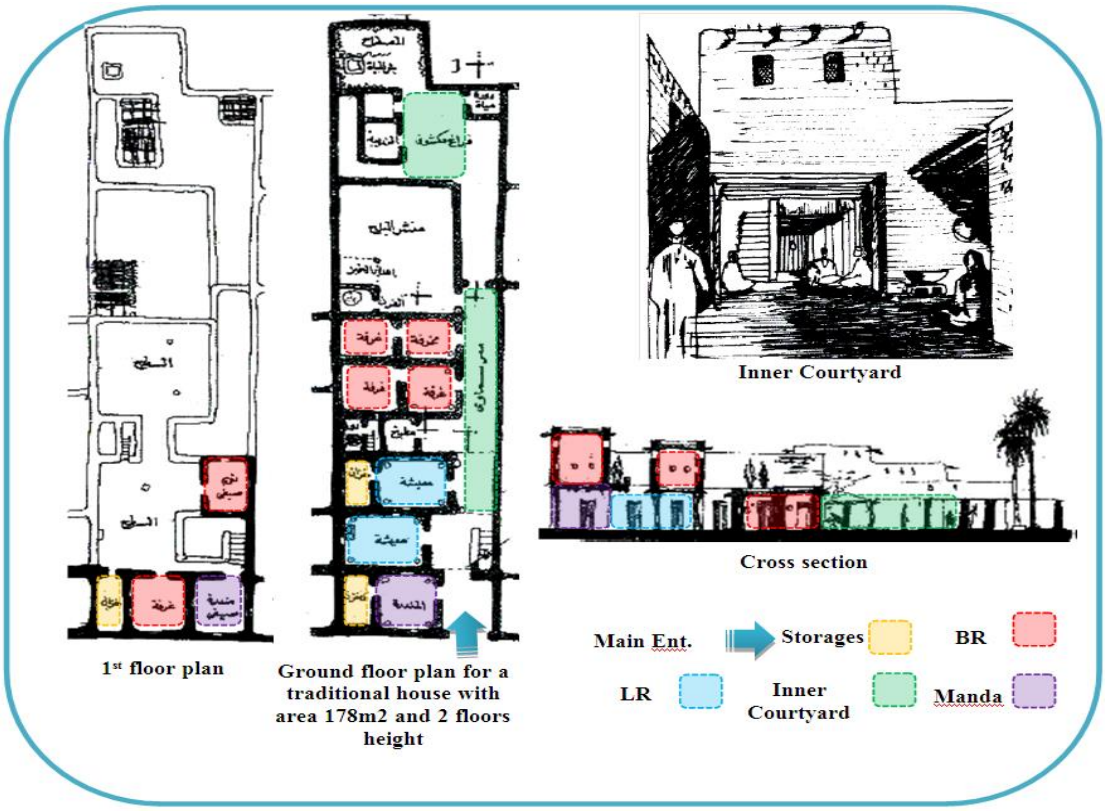


Figure 17: Second example of Traditional House in "Bawiti Low" [5]

6. Urbanization patterns in the study area - "Al-Bawiti Low" in Bahariya Oasis.

The architecture of the Bahariya Oasis is considered as a model for the history of Oasis spontaneous architecture of desert societies, where there are Pharaonic, Roman and Islamic monuments, in addition to the ancient and contemporary traditional construction. [12]

The current urban mass of the "Bawiti Low" is divided into two contiguous urban patterns as follows:

- Traditional rural urbanization pattern
- Modern urbanization pattern

6.1.1. Traditional rural urbanization pattern

The traditional rural urbanization pattern spreads in the "Bawiti Low" in the old town, located on a stone plateau north of the current "Maamour" of the oasis. It is dominated by spontaneous oasis architecture style such as; mud bricks constructions, narrow streets, one floor buildings, fodder stores… etc., and the traditional rural house characterized by rare openings overlooking the street, in order to preserve customs and traditions that take into account the privacy, and often the room overlooking the street, which is called "Mandara" as it designed for guests meetings. (Figure 18)

Figure 18: Traditional rural urbanization pattern

6.2. Modern urbanization pattern

The modern urban pattern appears in the "Bawiti Low" in the Bahariya Oasis, which is the capital, where it is dominated by the modern urban planning, such as; the style of housing architecture, building materials, the wideness and straightness of the streets, which spreads in the east, south and west directions, respectively.The residents are also replacing and renewing their old residential blocks, and rebuilding them in a modern style, due to the high prices of land in the new urban areas, in addition to the proximity of the old block to the public service which is gatherings of the oasis such as; government services, markets, mosques, schools...etc.The modern urban pattern is new and unfamiliar to the people of the oasis, and is not compatible with the desert environment because they use the concrete ceilings and columns instead of the ceiling which made of palm tree trunks or trees scatteredand covered with palm leaves, and also used white bricks in the walls which imported from the Minya quarries.(Figure 19)

Figure 19: Modern urbanization pattern

7. The problems of landslides in the oasis architecture in the Bawiti depression.

Much of the oasis architecture is at risk due to landslides, resulting from rock falls or rock encroachments, and the

result of that construction in this area is unorganized and random.
Most of the buildings in this area are touristic facilities such as; the Bawiti Palace Hotel, and the Panorama Oasis Hotel, all of these buildings are built directly under the feet of the "Mandisha Hill",

and this threatens them with the collapse of basalt rocks on them, also there are some random buildings that the people erected next to the hill, at the area located on the outskirts of the "Bawiti

Low". [8] (Figure 20)

Figure 20: The Bawiti Palace Hotel which are built under the feet of the "Mandisha Hill"

8. Planning mechanisms for spontaneous architecture in desert communities at "Al-Bawiti Low" in the Bahariya Oasis. [10]

- Providing local building materials, as well as providing trained local labor, which helps to save energy that consumed in transportation and construction operations and the costs of using foreign labor.
- The homogeneity of buildings heights, which provides privacy and the use of the tall handrails in roofs to provide privacy to be able to do any activity that, serves the building during the day and overnight.
- Using the prevailing winds in building orientation to choose the best location for toilets and insure that it wasn't facing or blocking the prayer direction.
- Designing the recessed entrance to provide privacy for the house's resident and designing the houses without facing each other.
- The house includes more than one entrance (one for the residents, one for the services… etc.)
- The internal movement between residents and their raised animals should be separated.
- Thehouse's rooms oriented around the internal courtyards, and some houses contain several internal courtyards, including a yard for guests which work as an external waiting place toachieve privacy for residents.
- Separating the guest room "Mandara" from the other house's room

9. The effect of planning mechanism design considerations change in the spontaneous architecture of the Oasis "Bawiti Low" in the Bahariya Oasis. [13]

- Replacing the traditional buildings design with modern design not only in buildings facades but also in the inner spaces organization, in addition to using some formal phenomena symbolizing the Islamic identity such as; the use of arches and Islamic decorations.
- Changing the urban fabrics mechanism as a result of using different types of transportation without any previous planning as a way to reconcile the traditional systems and modern planning methods, to accommodate the different type of transportation.
- Disappearance of popular squares and celebration public spaces.
- Making fences and barriers around archaeological sites and separating them from residential areas.
- The architecture of government buildings such as; schools - hospital - government departments - police department ... etc., with using the same patterns that used in the cities and villages of Lower Egypt and Upper Egypt, without taking into account the difference in the environment or culture.
- There is no trace or indication of the old irrigation systems, which relied on "manifests" despite its importance and replacing it with energy-consuming motors to raise water.
- The spread of resorts and touristic villages on the outskirts of the population centers with complete separation from them.
- The complete neglect of the traditional buildings in the high areas, some of these buildings are still in varying states of dilapidation, and it has been abandoned by most of the people who moved to the bottom of the valley.
- There are some individual attempts by some residents to use architecture that compatible with the environment through using local building materials.

10. Standards and criteria of planning mechanisms to protect the spontaneous architecture in desert communities and its interaction with the surrounding environment at "Al-Bawti Low"

- Relying on renewable resources as long as possible for the sake of future generations.
- Rely on holding discussions and participating in work, as they are able to protect heritage and identify needs.
- Taking into account that the design of the general formation of the urban extension in the desert and oasis with taking into consideration the land's topography and air movement.
- The use of the integrated architectural and urban configuration, which is commensurate with the environmental and social conditions of the spontaneous architecture in the study area.
- The proposed lanes and streets should be narrow, winding and shaded. Also the entrances and exits of the lanes should be studied in line with the residents' customs and traditions.
- Using local building materials as much as possible such as; stones, clay, sand and wood, or developing the local environmental materials using appropriate technology.
- It is necessary to pave the lanes and paths with stones instead of leaving them dirt, in addition to using the elements of landscaping and water to increase humidity and purifying the air.
- The inner courtyard must be taken as an essential element in the design of residential and service buildings with taking into account that the thickness of buildings wall should be very thick to provide good thermal insulation and finishing materials should be painted with light colors to increase the reflection of solar radiation.

11. Results

Through the research study, some important scientific results were drawn:

1- Sustainability of desert communities with oasis spontaneous architecture: to achieve that the involving of practitioners, professionals is must in addition to understanding the ecological content of the geographical location, through the three sustainability foundations
   A- Monitoring the natural conditions of the desert and oasis communities: to achieve the integration and diversity of their ecosystem and vitality.

B- Monitoring the social and cultural conditions of the oasis desert communities: to determine the cultural and natural peculiarities that govern the local social relations such as; hierarchy of power, empowerment and equality among members of the group.

C- Monitoring the economic conditions of oasis desert communities: this means the potential for providing job opportunities to determine the growth, development and production of oasis spontaneous architecture

2- Topography of urbanization in oasis desert communities: The urbanism in the oasis desert oasis societies is characterized by its topographical diversity and the cultural and historical heritage which characterized by being built with skill and creativity that is rarely found anywhere else.

3- The general shape of the urban fabric in the oasis desert communities: It is characterized by being harmonious with the natural and climatic environment, and according to the prevailing local social and cultural lifestyle, it became a local imprint of urban ecology in those areas, and the contiguousness of the oasis buildings in the compact composition increased the stability of the oasis buildings with each other, as well as the gradation in height and the consistency of the buildings with the shape of the land gave a great harmony with the surrounding environment.

4- Building materials used in desert and oasis communities: Local materials such as; sandstone, limestone, basalt rocks, mud bricks and "kershef"has been used in houses constructionalso, the hard woods have been used in the construction of ceilings and doors such as;palm trees or trees scattered in the oasis.

5- Privacy in the traditional Oasis houses: The gradation of privacy must be taken into account in the interior design, where important elements that require privacy have been placed on the upper floors, and the ground floor is allocated to public and service activities related to the residence.

6- Traditional rural urbanization pattern: There have been many changes in the traditional rural pattern, and these changes are associated with the start of opening up to other areas, the development of economic and social conditions, the use of modern advanced technologies in construction work, and the entertainment and attractions these buildings provide, and as a result of the increased income, the people left their traditional buildings or demolished them, and created strange urban patterns far from the traditional pattern that characterized those areas also they replaced their traditional houses with buildings that used a modern materials. And all of this created a negative image of the oasis architecture desert communities and their environment.

7- Modern urbanization pattern: Because of the changing economic factors, there was a rush towards the production of modern architecture, which is not environmentally and socially compatible with the desert and oasis communities, without regard to the environmental and cultural values to which those societies belong.

12. Recommendations

- It is not possible to preserve the environment and layout of the oasis spontaneous architecture, without knowing or defining its character's identity, so that we can draw a clear identity for the features and characteristics of this heritage in order to know its distinctive vocabulary, elements, and the civilization features it in order to preserve it and root its value in contemporary architecture.
- We must draw attention to the importance of the urban pattern of spontaneous oasis architecture, in order to preserve it, so the community must be directed and culturally aware of the importance of its heritage which carries unique environmental and architectural values.
- The identity of the spontaneous oasis architecture must be preserved and taken care of by governmental and international heritage institutions.
- Coordination and linkage between the governmental institutions concerned with developing a strategic framework, drafting legislation and the community associations interested in oasis spontaneous architecture, in implementing planning mechanisms to protect these areas.
- Preserving the spontaneous populated areas, through separated the developed tourism services from it.
- Activating the media's and educational institutions role to raise the awareness of the oasis spontaneous architecture of desert communities, and how it effects on economic and tourism development.
- Increasing the human resources investment that characterized the Bahariya Oasis, as the population is the locomotive of sustainable development, Therefore, attention should be paid to training them and developing their capabilities in various human activities, in addition to raising their awareness of the culture of preserving their environment also, holding workshops and educational courses, and this investment has an economic and social impact on the national security system.

- Preserving the urban patterns that are compatible with the spontaneous architecture of desert environment conditions with spreading the desert environmental awareness to facilitate decision-makers to direct the urbanization of these communities towards the optimal environmental situation in the future urban plans in the regionin order to achieve a balance between the objectives of environmental protection and sustainable development goals that are compatible with the environment of the desert and oasis communities.
- The oasis desert areas are characterized by containing many natural and cultural wealth, which qualifies them to be among the best main areas for eco-tourism and heritage, so they should be placed mainly on the tourist map of Egypt, Also the natural wells are one of the most important elements of medical tourism and environmental healing in the Bahariya Oasis therefore, it must be preserved.
- It is necessary to highlight the economic role of investment in the field of developing the oasis spontaneous architecture in desert communities, and the field of conservation, rehabilitation and use, in addition to identifying obstacles that impede the financing of projects to preserve cultural heritage, and finding solutions to them.

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