

THE FORMULATION OF PLANNING AND DESIGN PRINCIPLES FOR BUILDING IN DESERT CLIMATE; APPLICATION : THE NEW VALLEY OF UPPER EGYPT

Inass Hamdy and El Sayed Amer

Department of Architecture, Faculty of Engineering,
Alexandria University, Alexandria 21544- Egypt

ABSTRACT

Creating a new valley has been under thought and is now being under implementation, with great support from both politicians and planners. The new region is characterized with harsh environmental conditions. Two main issues have to be considered; the first is how to attract the new comers and help them to be acclimatized to new conditions which are completely different than the relevant ones at the Nile delta. The second is how to create a built environment that can harmonize with nature in a positive interaction to result in minimum loss of environmental and financial resources. Passive environmental control will add a sensitive and emotional effect to the built environment, dissolving the hard edge between lessons from history and modern technology. This research aims at determining a planning and design criteria and guiding principles for the urban forms and details which would allow optimum environmental conditions to be created in the settlements proposed for the new delta. Major problems which face the planner and the architect are how to include physical, demographic, social and economic considerations. Practical examples with similar conditions are then reviewed. Finally, lessons experienced through the scanning approach are used to set up the urban and design principles to be generalized.

Keywords: Environmental design, Planning principles, Design criteria, Passive control, Desert architecture, Toushki.

INTRODUCTION

The interaction between man and environment has been given a great deal of attention during the last ten years. This Attention can be seen in the efforts done by researchers, and decision makers and Politicians of all nations.

One of the main issues discussed in many conferences lately is concerned with the commitment of the developed countries specially toward improving the quality of the environment in the developing part of the world. Such commitments never happened, which indicated that developing nations should be independent in taking care of their local resources to include the built environment.

Egypt is one of the nations which realized the problem of improving the

environmental standards and living conditions for its inhabitants.

THE NATIONAL URBANIZATION POLICY IN EGYPT

Egypt has been suffering from the over exceeding population densities and increasing migration pattern from rural regions to the capital cities and urban centers. This resulted in increasing housing and environmental problems which in turn had their negative effects in all the development dimensions. These problems were behind the necessity of finding new development trends.

The development policy of Egypt has traditionally been oriented around the Nile valley and it's delta, which resulted in concentrating the population in that narrow

strip, while 96% of Egypt's area was left as desert without urbanization. The Problem of increasing the population density and decreasing the cultivated land was recognized by the decision makers and fourteen of new towns have been built to attract the people and decrease the over-expanding population density in traditional urban centers.

The new towns have absorbed a very limited percentage of the population. But lately, it has been recognized that all the new towns were built considerably around the narrow strip of the Nile and it's Delta, Supporting the linear pattern of development. Additionally, the new towns are not self-sufficient and they are relying on the existing urban centers. This pattern led to the necessity of spreading out the development in the rest of vast desert regions. Thus, creating a new Valley has been under thought and is now being under implementation.

THE NEW VALLEY OF UPPER EGYPT AND IT'S OBJECTIVES

The development of the new valley of upper Egypt has been given a great support from both politicians, and planners. The Project aims at increasing the urban areas to be 25% of total area of Egypt instead of being 4.5%, which did not cope with the over population density in proportion to the size of Egypt's land. Within the above aim, the project is to achieve the following objectives;

- 1- Attracting the immigrants from existing rural regions instead of moving to the existing congested urban centers. Also, new jobs can be offered and suitable houses, built on optimum principles as hoped.
- 2- The project is planned in comprehensive development such as agricultural, industrial, touristic, educational, transportation and communications, housing,...etc. This development will include building self-sufficient settlements and avoid relying on existing major urban cities.

- 3- Giving up the centralization planning policy which has been taken in Egypt. Such policy resulted in urban congestion and environmental deterioration and lack of jobs and other problems which form challenges in front of developing the Egyptian society.
- 4- Encouraging the investment possibilities which raise the private and national income.

However, the development of the new valley of upper Egypt became a fact and migration trends to these new developed areas have to be encouraged. Such development would not be purposeful unless residents and migrants live comfortably in the new environment they are going to accommodate. The new region is characterized with environmental conditions of harsh nature. Therefore, settlements should be highly conscious in terms of site selection and design principles and criteria that can help in creating optimum environmental conditions for inhabitants. Such new settlements should be planned and designed to attract people who are not native to the new developed areas. Those new comers will have to be acclimatized to new conditions within a harsh environment which is completely different from their previous experience in the Nile delta.

THE AIM OF THE RESEARCH

The aim of this research is to determine planning and design criteria and guiding principles for the urban forms which would allow optimum environmental conditions to be created in the settlements proposed for the new delta.

This concern is given to:

- 1- Select sites that would allow settlement's to take advantage of the prevailing climate.
- 2- Identify the urban pattern of the settlement and to what extent they are adapted to the prevailing conditions.
- 3- Determine building design and form and elements of design that achieve human comfort for residents.

**The Formulation of Planning and Design Principles for Building in Desert Climate;
Application: The New Valley of Upper Egypt**

4- Identify social needs and cultural level that should be considered in the settlements layout plan and design.

THE RESEARCH METHODOLOGY

The research is determined to study the problem in its theoretical framework, to identify the major issues that contribute to the problem and to follow a scanning approach. Practical examples for existing settlements of similar environments are reviewed to identify lessons that can be gained and applied in newly developed regions. Lessons experienced and issues identified are used to setup urban pattern and design principles that could create optimum environmental conditions and to be generalized for environments of similar localities.

HISTORICAL REVIEW OF DESERT URBANIZATION IN EGYPT

Historically, there were only very few bedouin settlements scattered in the desert, taking a defensive form. Transportation networks in the desert regions were only built to serve military actions and mining activities. Desert has been left behind without urbanization because of difficulties in finding water and the governmental planning policy was taking the centralization trend, and linear pattern of development around the Nile valley.

In the nineteenth century, the governmental attention started to be oriented to develop the desert (for reasons mentioned earlier in this study). The National organization for desert urbanization was established and started in some projects such as; Tahrir project in the desert (1955); The New Valley in the west desert (1959), El Nasr canal project in Maryout; and the Natroon Valley in the west desert. In 1976 all these projects were stopped and urbanization process in desert regions have been deteriorated. This resulted in housing problems in the eighties and which directed the national concern to development in the desert starting with building new towns and ended with the decision of developing the south of valley in the desert of Egypt. Figure

1 shows the new development areas in the new valley of Upper Egypt and Table 1 illustrates the proposed urban areas and population for the next twenty years.

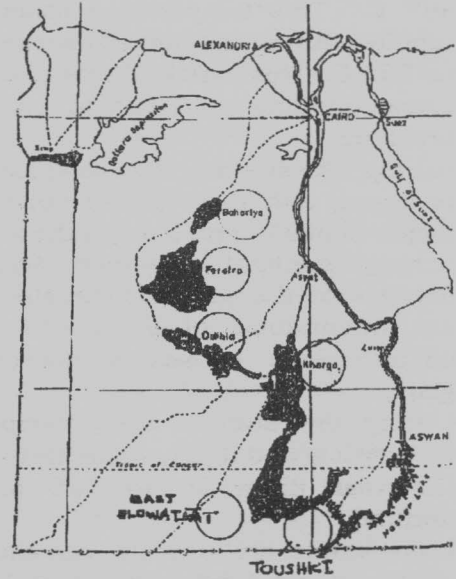


Figure 1 New development areas in the New Valley of Upper Egypt

Table 1 Proposed urban areas and population till the year 2017 [1]

Urban centres	Built up areas in feddans	No. of population in thousands
Toushki	2500	50-100
El kharaga	3500	100-140
Dakhla	2500	100-140
Farafra	3500	100-140
East Owainat	2500	200-300

PLANNING THE NEW VALLEY SITE: BASIC CONSIDERATIONS

This part focuses on the unique treatment required from the qualified planners, because of the planning problems resulting due to the special stresses, of an arid zone. However, the points of concern in the new valley can be classified as climatic, physical, demographic, economic and social considerations.

The climatic characteristics in the new valley of Upper Egypt

The new valley of Upper Egypt is located in the hot dry desert climatic regions. This type of climate occurs in two belts between 15° and 30° north and south of the equator.

There are two seasons in these areas, a hot and a somewhat cooler period. The main climatic features can be summarized as follows:

- 1- Day time temperature ranges from 43° to 49° C. This temperature cools down rapidly during the night to between 24° to 30° C. This quick fluctuations may cause building materials to crack and break up.
- 2- During the summer day, solar radiation is strong and direct and it can create a major climatic problem in these areas. Strong sunlight together with the dryness of the ground can also create an illumination of 20,000 to 25,000 cd/m² which causes a harmful sky glare.
- 3- During the summer time, precipitation is very low and it is variable throughout the year (from 50 to 155 mm per annum).
- 4- Local winds are usually hot and carry dust and sand from the very dry soil, thus causing dust and sand storms.

Arid zones are defined as areas with an average annual precipitation, very low humidity, an average annual rate of evaporation greater than the average annual rate of precipitation, great variation in day time and night time temperature. All these specification are identical to the climatic conditions available at the new valley of upper Egypt.

Physical Considerations

In Egypt, the consideration of settlements of different forms and functions which respond to the unique nature of a desert climate is obviously needed. Luckily, the arid zones were among the very first to establish villages and cities that lasted thousands of years without interruptions until our time, carefully adjusting to the environment and the climatic stresses of the arid zone. These ancient lessons have to be considered among other aspects such as energy shortage and lack of funds which confirm the importance of solving the city problems with local resources. Recent research on arid zones resulted in some

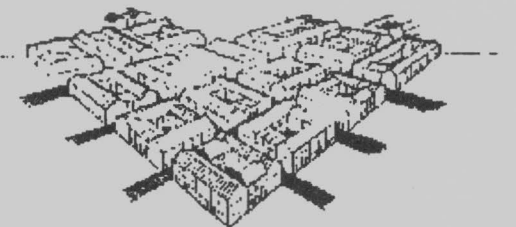
guidelines which aims at creating a man made controlled micro climate; affirming the advantage of :

- Compact city structure with relatively high density and low building heights.
- Covered or domed sections offering proper ventilation and insulation.
- A close proximity of all land uses.
- The use of special building materials and colors.
- Innovative housing designs for humidification and ventilation.
- Special cityscaping and landscaping to moderate the climate of the settlement.

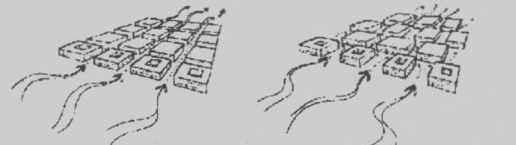
The study of the impact of development on the ecosystem of the arid zone must be a prerequisite to any planning and construction. The impact can be positive if the plan influence the local climate favorably or stabilizes the physical dynamics as seen in Figure 2, or it can be destructive if air, water, or land pollution results.



A. GRID PERPENDICULAR AND PARALLEL TO EAST-WEST AXIS



B. GRID DIAGONAL TO EAST-WEST AXIS



E. STRAIGHT, PARALLEL STREETS AND ALLEYS F. STRAIGHT, BLOCKED STREETS AND ALLEYS

Figure 2 Ways of properly designing urban forms in an arid region in response to solar radiation and wind [2]

Demographic Considerations

Because of the demanding conditions under which arid zone development occurs and ideological motives are required, young, dynamic settlers should form the base for a population pyramid to consist of young bachelors (18-30 years) and young married couples (20-30 years of age) with or without children.

Friendly contacts and social integration, should be encouraged, diminishing social distinctions and barriers. Housing plans must accommodate the various groups considering the unique structure of the society of an arid zone city, affecting unit size, type, design, grouping, requirements for private and public space, proximity to other land uses, maintenance and depreciation.

The town must be a self sufficient community as soon as possible, and planners must consider a rapid population growth in the early development phases which should be reflected on planning the social services, educational amenities, medical services and spatial requirements of the project.

Speedy development and construction are part of the national image of a stable community that can attract various social classes and has to be considered as a higher priority during the realization of the new valley of upper Egypt project.

Social considerations

Culturally speaking, people of a given culture are primarily bounded by a common world, view of ideals and choices and by a set of values and rules which produce their life style and manners as embodied in their image of their environment.

The issue of privacy, inherently important in Islamic societies dictates a well defined behavior within the traditional physical habitats where separation of public and private life is very clear. This consequently affected the use of urban spaces, street system and house settlement according to different rules,

needs, values and desires of group or individuals

The studies of several researches suggested an important relationship between design features such as street, courtyard, play area & building arrangements and the interior space, all to involve the social and psychological factors.

The project should state:

- a- The needs of the inhabitants life style.
- b- The needs of belongings.
- c- The degree of required participation in informal and formal groups.
- d- The degree of pride in the appearance and feelings about family status.

The settlements of past and existing experiences of arid regions showed that the compact pattern of buildings is the most successful form in meeting the previous needs. Recommendations are also given that the low rise structures are desirable for families with children which represent the expected majority in a new development.

Economic Considerations

The unique climate of the arid zone offers some advantages for the more intense planning, building and development of economically or socially important facilities as recreational and civic centers, energy production plants,... etc. These facilities are important to attain self sufficiency, the city should be planned to have as diverse. The relationship between development phases, population size, and the goal of self containment, mandates resources. Because of the financial risks involved in the early phases of development, and since it has been found that climatic differences correspond to variations in per capita income among countries (i.e., the more arid country has, the more likely it is to have a lower per capita income), then the regional development will require subsidies from the public sector to start with.

URBAN PATTERN OF DESERT SETTLEMENTS

When discussing the past experience of arid and hot desert settlements a compact layout pattern has been experienced. The

final mass plan appeared as one solid block with narrow open spaces and passages sometimes closed ended as seen in Figure 3.

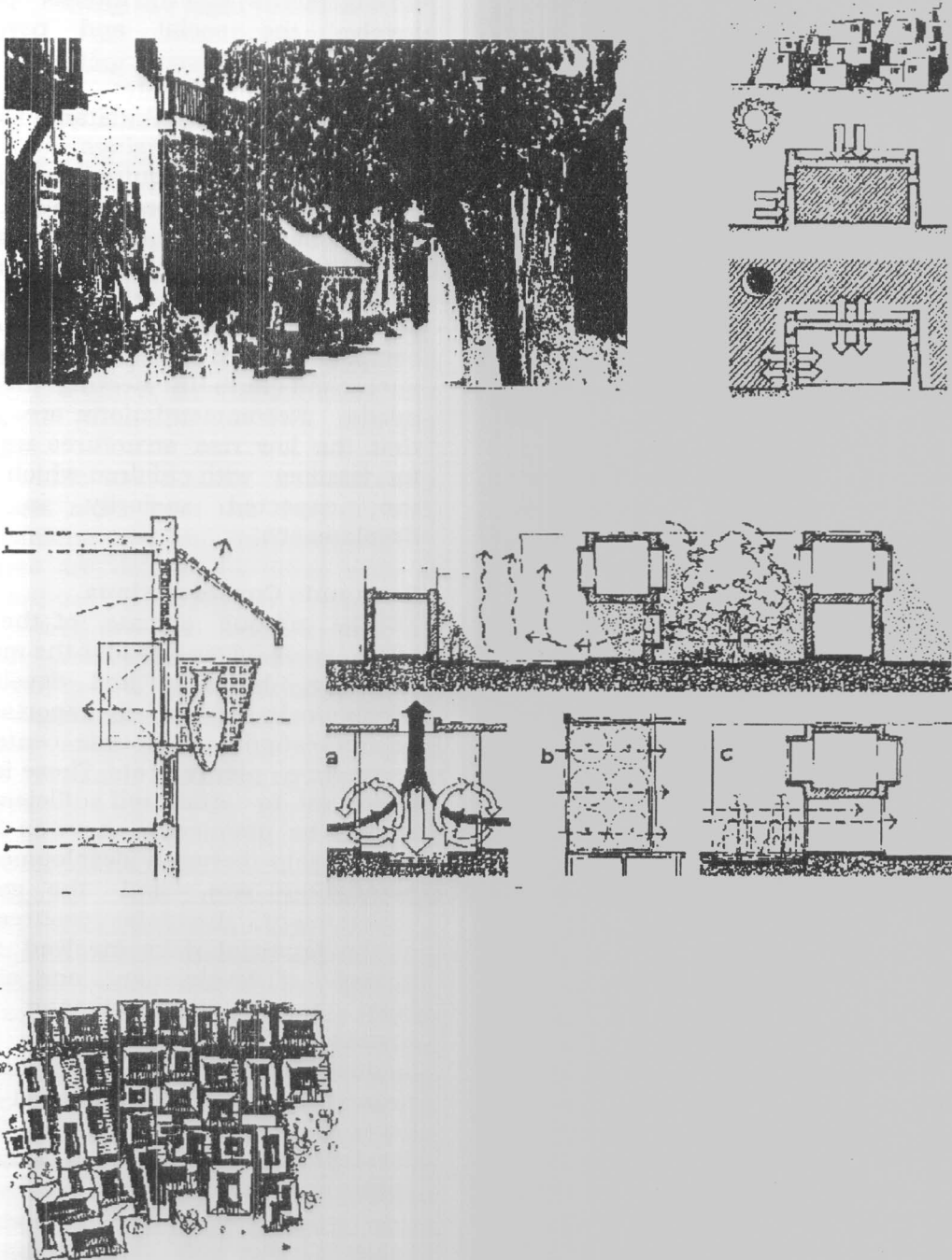


Figure 3 A compact pattern of buildings in hot and dry desert settlements-shaded outdoor environments are resulted. Buildings are built using design elements which fit with the hot desert climate [3]

The Formulation of Planning and Design Principles for Building in Desert Climate; Application: The New Valley of Upper Egypt

Some researchers have explained this as common tendency of desert residents for living near to each other as they are related to one family or one tribe. This was related to defending each other from the external invaders, coming from the surrounding desert communities. Another explanation referred the narrow passages as residents have done them just to reach houses with minimum dimensions and there was no need for wide streets. The more successful explanation of compactness layout pattern was related to both social demands such as privacy and way of life and how to protect and maintain such demands from the severe climate of desert harsh environment, providing comfortable living conditions. To Prove this explanation, if we review the desert traditional settlements we find patterns are varied from desert region to another, according to the nature of the prevailing climate. In hot and humid desert climate, a dispersed pattern of buildings is remarked. In hot and dry desert climate, a compact layout plan is experienced.

But despite of the differentiation in layout patterns, the planning principles are the same such as, spaces hierarchy, building techniques and design concepts, all of which are necessary to protect and answer the social requirements and provide a modified natural climatic conditions.

However, the past desert settlements were built to meet certain demands, imposed by restricted way of life. But, today such demands have some changes, the society we are building became more open (because of being in usual contact with the nearest urbanized civil centers), the car became part of the society as means of transportation, instead of animals, and new activities have been introduced.

Accordingly, the urban scale and its components has to follow the new requirements. Additional important point, in the regional scale, desert settlements have to be considered in the regional development plan and sometimes at the

national scale which applies to the development of the south valley.

EXAMPLES FOR NEW DESERT SETTLEMENTS IN REGIONS OF COMPARABLE NATURE

Following the scanning approach, a number of examples for new developments having similar conditions and lying within the same climatic zone, Figure 4, had to be analyzed and focus on the important planing and design principles are to be concluded. The examples are selected from Saudi Arabia, India, Israel, and Egypt. Lessons can be derived in the form of principles that have been considered in settlement planing and design to provide comfortable environments for the residents. Lessons can be developed to adapt the social performance and requirements of the new valley of upper Egypt.

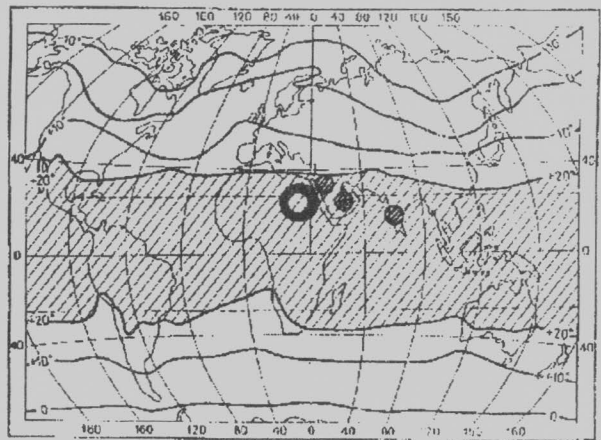


Figure 4 Relevant examples within the same climatic zone: 1. New valley of Upper Egypt, 2. Yanbu Saudi Arabia, 3. Rajasthan desert India, 4. Bet-Sheesh Israel [2]

Yanbu City- Saudi Arabia

Yanbau is an industrial city in Saudi Arabia. The basic planning and development concept for community land use provides a concentration of higher density of residential tower houses around the city center with lower density uses and villas around the city periphery, (see Figure 5). The pattern concept is mainly depending upon a spine, used as pedestrian walk way system connecting all major facilities and a loop road system to support it.

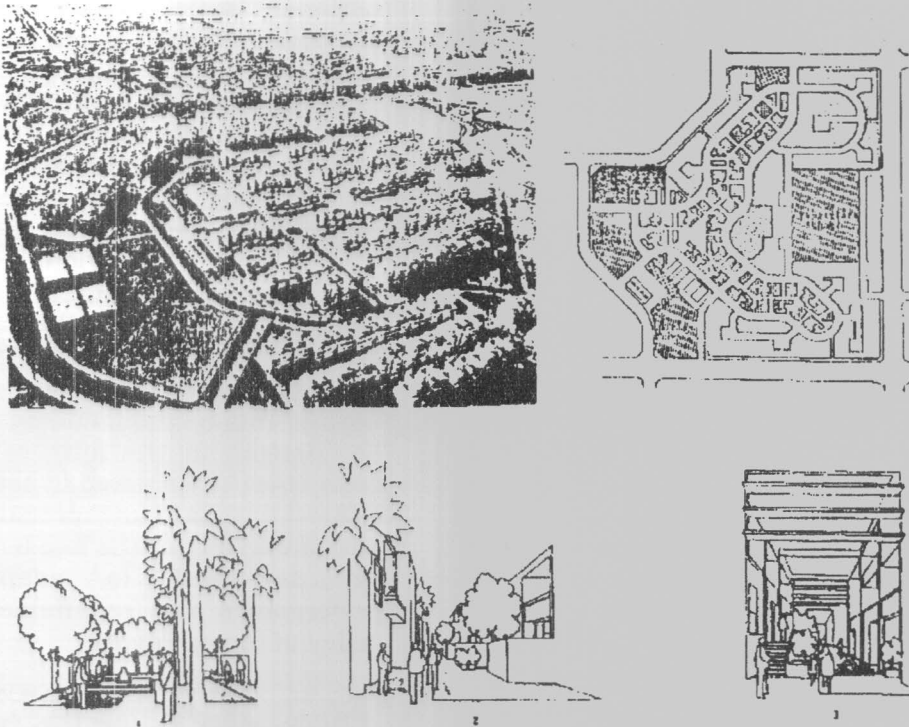


Figure 5 An industrial city in Saudi Arabia-the urban design is mainly a compact pattern of considerably narrow streets, producing outdoor shaded spaces, [4]

The urban design is mainly a compact pattern of considerably narrow streets; producing outdoor shaded spaces. Building heights vary between 2 or 3 story height for villas and town houses and four stories for apartment buildings. Some open spaces are introduced at the intersections which gave extra play and sitting areas in addition to the major public space. Narrow winding streets are oriented to the prevailing wind direction and which cause air movement is increased in velocity in the pattern open spaces. This pattern also avoid the monotonous feeling. Buildings are oriented to the prevailing wind and built of thick walls, covered with marble using deep openings to reduce the effect of both solar radiation and high temperature.

Cablenagar Township kota Rajasthan Desert- India

It is a community for workers in township kota in India. The prevailing climate is hot and dry with severe summer and a very mild winter, short warm and

humid period, heavy winds and sandy storm, high diurnal range of temperature variations. The urban pattern consists of two storeys and many types of plans (every plan has an interior court) Forming a cluster pattern of buildings in rectangular blocks as seen in Figure 6.

The courtyard works together with using the local sand stone as building material and a modified indoor micro climate is resulted. The courtyard has brought extraordinary benefits, by attracting the preferable air movements to get in during the day and trapping cool overnight air, providing humidity and comfort in the hot dry afternoons. Walls are built from thick stone, the thicker it is the longer it takes to heat up but once this happens, it continues to radiate out and finally rooms remain cool during most of the day.

Bet-Shemesh- Israel

The climatic-environmental examinations of the Bet-Shemesh city master plan included a thorough examination of different

**The Formulation of Planning and Design Principles for Building in Desert Climate;
Application: The New Valley of Upper Egypt**

areas of the city according to their climatic characteristics; functions and effects of existing conditions. The residential

neighborhoods were located on top and south eastern parts of the hills as seen in Figure 7.

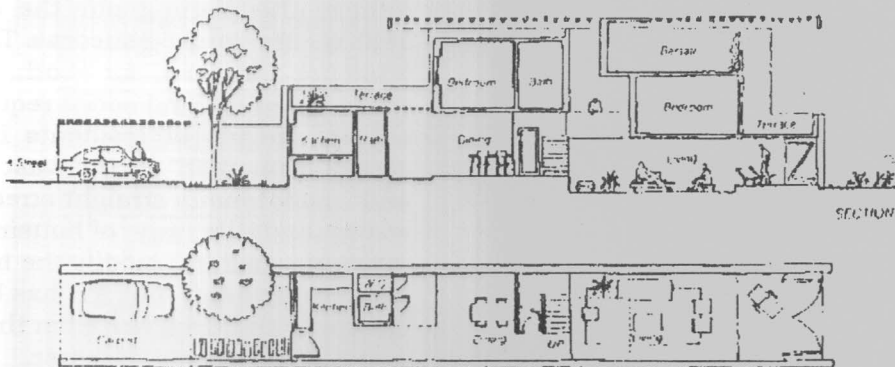
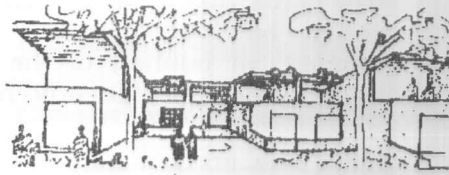


Figure 6 An example for workers community in India. It is clustering pattern and using a courtyard and thick stone walls, providing climatic adaptation for hot and dry de sert climate [5]

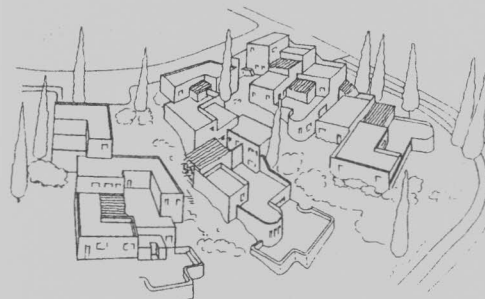
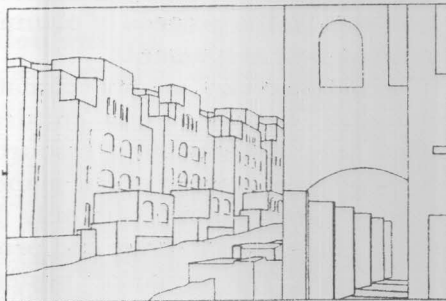
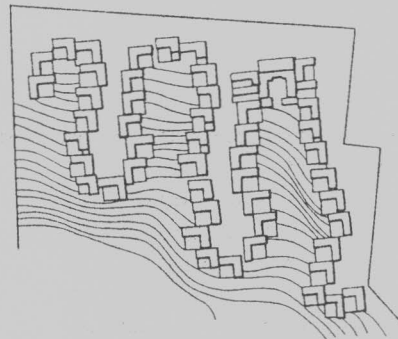
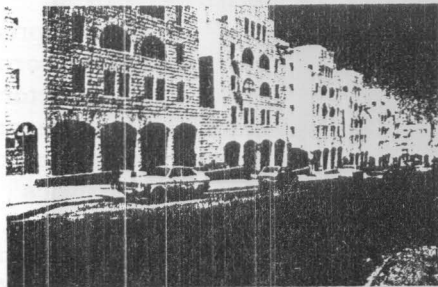


Figure 7 Neighborhood planning and building types in Bet-Shemesh, Israel: showing combined residential and commercial functions in an area of high density & Family houses at low and medium density areas, [6]

Those locations had moderate temperature, relatively low humidity and good ventilation. Valleys suffered from poor ventilation, low temperature and higher humidity during winter nights - high temperature and high daily temperature changes between day and night during summer. Therefore, these areas were defined as poor areas for buildings.

The main roads were located in the long continuous valleys, their main direction was west east, the same direction as prevailing winds. Hospital was located on the top of the hill and sources of pollution were located in the leeward direction of prevailing winds so that the polluted air would not pass over the residential areas. Planting trees and vegetation helped to achieve better micro climatic conditions.

The general concept showed that areas of high density buildings were located on the top and higher parts of the hill and low density buildings on the lower parts of the hill slopes, to give the best climatic conditions to the majority of the population.

Details of building design reflected adaptation of different projects to the environmental conditions as seen in buildings orientation, solar radiation control, application of proper ventilation rules, form and direction of roofs, color selection,.....etc.

A new governmental example in the New valley of Upper Egypt

It has been very important for the study to identify the vision of the government related to the settlements planning and design principles and to find out to what extent they are adapted to both social needs and climatic constraints.

The government has prepared the first example to be built in the new valley of upper Egypt, (Figure 8). The project is a village, built to accommodate workers in Tushki project. The site was selected near to Abo Simble airport. The village consists of 88 units for housing. Considering the harsh climate of high temperature and solar radiation, the layout plan is not adapted at all. Housing units are exposed to the sun

and solar radiation. These units could be fitted to other environments except the new valley of upper Egypt. Also, such pattern lacks shaded spaces which are very important in such climate. Therefore, settlements due to be built in the new valley should be very carefully planned and designed in relation to the planning and design principles that could help in creating a comfortable climatic environments for those who are going to accommodate the new region. A typical example was also built by the government in the west desert to accommodate farmers coming from different places to cultivate the newly cultivated land. Neither the planning nor the design of the settlements proved success. The settlement was not adapted for both, the climatic characteristics and social requirements and simple means of residents life. That was clearly remarked in the vast open spaces and monotonous straight streets (30 meters width) and the way of housing design. The residents had to modify the basic design of their settlement, but if it has been correctly planned and designed from the beginning it would have been much better.

CONCLUSIONS AND RECOMMENDATIONS

The planning and design process is a comprehensive one, incorporating a great number of essential factors such as climatic, physical, demographic, social and economic factors in addition to the urban politics and administration. In recent years, there has been increasing recognition of excessive need to integrate climatological and environmental problems in the process of planning and building new settlements.

Buildings can modify climate, they influence behavior and culture, they affect the distribution of resources and the ecological pattern of our planet. Human aspirations can only be met when climate, buildings and people are in balance. The dynamic systems and processes which help to achieve this need work in an interdisciplinary

**The Formulation of Planning and Design Principles for Building in Desert Climate;
Application: The New Valley of Upper Egypt**

manner. Passive environmental control will add a sensitive and emotional effect to the built environment, dissolving the hard edge between lessons from history and modern technology.

The planning and building of the new valley of Upper Egypt presents an opportunity to apply this approach.

The main climatic problem in the south valley can be summarized in; high

temperature during the day and temperature fluctuation between day and night; low relative humidity and winds carrying sand and dust. Therefore, the site selection for settlements and their pattern and building form and design should take advantage of the prevailing climate and avoid and modify the disadvantages.



Figure 8 A new governmental example in the New Valley of upper Egypt. [7]

Site selection criteria

To select proper sites for building settlements, there are many factors to be considered such as economic base, and political decisions and environmental considerations and which is the concern of this study. However site selection should include investigations utilizing various methods and tools such as simulation of solar radiation, climatic maps, a topographic climatic survey, and the development of

methods of communications between the architect, the planner and the climatologist. Environmental conditions including climatic considerations should be highly taken into account in the comprehensive planning for the whole region. It is obvious that in planning a new region, there are many other factors and constraints which must be taken into account, such as economic, social and political ones. Climatic factors can not always receive the priority they

deserve. However, it must be emphasized that sites for building settlements should be selected on the bases of:

- 1- Locations and sites subject to cool breezes have to be selected for building settlements to alleviate the effect of high temperature.
- 2 Upper levels and sites sloping facing north to attract as much as possible of winds and air movements are preferable.
- 3- Sites which can avoid the sand and dust storms should be selected.

Urban pattern criteria in desert and hot arid regions

1. Houses and other structures should be grouped into compact clusters, to provide maximum shadow throughout the day, housing should be a net of interconnected clusters, and leave minimum walls subject to sun exposure and minimize the glare [8-10].
2. Trees and vegetation is a major element, that have to be considered and penetrating the compact pattern of buildings in order to maximize the shaded spaces and increase and modify the relative humidity. Also, trees can be used for directing favorite winds where required and protecting from dust and sand storms.
- 3 Water bodies are important to reduce climatic stresses of increasing temperature and to modify humidity.
4. A pedestrian network should be confined by buildings and trees so as to form a protective environment.
5. A hierarchy of open spaces should be planned to gather between the need for open spaces for using cars and avoid being non continuous. Winding streets and passages may achieve the purpose.
6. In addition to climatic performance, open spaces should be planned to answer the social needs and activities. For example, the urban open spaces needed in the rural successful settlements must be varied from those in touristic ones.

7. Large and unshaded open spaces should be a voided by locating urban land uses near each other.

The above criteria are based on the following considerations;

- 1- The compact pattern of buildings which act, for minimizing heat gain and heat loss, also molds outdoor environment with it's relatively narrow streets and open spaces. With adequate orientation of buildings and streets, shades resulted from building configuration, and shading devices should allow a livable environment. It also results in reduction of vehicle transportation within residential areas and minimize the walking distance in such a harsh environment.
- 2- The compact pattern of buildings encourages social interaction among different groups living in the settlement, especially among children and elderly persons. It is more useful than any other urban form, for social interaction.
- 3- Building in desert is different from building in the existing urban centers. Heights of buildings should not be more than two floors for many reasons:
 - To avoid being subject to the winds carrying sand and dust from the surrounding dry desert landscape .
 - Land is vast and extended and high rise buildings will appear as odd in relation with the vast and extended desert land- scape.
 - High rise buildings will be subject to the solar radiation which is one of the main climatic problems in the desert dry and hot climate.

Building design criteria

In desert regions buildings are constructed with a minimum size of deep openings to avoid the effect of direct sunlight. The major windows are oriented toward north direction in order to avoid direct sun and solar radiation.

Buildings design should contain elements that suit and adapt to the dry hot desert climate. Experience of existing

**The Formulation of Planning and Design Principles for Building in Desert Climate;
Application: The New Valley of Upper Egypt**

settlements showed some elements such as, [11-13].

1. The courtyard inside the house unit as natural modifier to the climate attracting cold air from narrow and shaded passages through the compact pattern of buildings that have been proposed.
2. A tree could be planted in the courtyard to offer shaded area for sitting place. Also it is useful to have water element inside the court to modify the low humidity and initiate the favorite air movement inside the court and which can be attracted by the house opening located on the court.
3. Using shading devices on the top of windows is also recommended. Such devices could be made from penetrated wood (mashrabia). These composition of design devices create shade and breezed air movement.
4. Domes and vaults proved their importance for modifying the indoor climate in building. They avoid being subject to the direct sun during the day and develop indoor air movement.
5. Wind catchers are also important for in building design to catch air into the indoor areas and modify their micro climate.
6. Row materials can be a key factor in modifying the indoor climate, materials with sufficient time lag to delay heat transmission during the day

In addition to modifying the micro climate, all these features and design elements work together and produce a unique character and architectural vocabulary. Such character can be appreciated by locals and tourists and can be considered as one of the attracting features for the new development.

REFERENCES

1. Ministry of Housing, Infrastructure and new urban development, The National project of New Valley of Upper Egypt. public authority for urban planning - Cairo, Egypt, (1996).
2. G. Golany, Housing in Arid Lands - Design and Planning, The Architectural Press, London, U.K, (1980).
3. A. Konya, Design pimmer for hot climates, The Architectural Press Ltd, London, U.K, (1980).
4. K. Talib, Shelter in Saudi Arabia, Academy Edition/St, Martin Press, New York, USA, (1984).
5. Y. Anany, Urban Desert settlements- Design Approach. Unpublished Ph D. dissertation, Dept. of Architecture, Faculty of Engineering, Alexandria university, Alexandria, Egypt, (1996).
6. A. Bitan and O. Potcher, "Theory and methodology of climatic planning and its application to the new city of Betshemesh " Town planning Review, pp. 66 (1), Liverpool University, Liverpool, England, (1995).
7. El Ahram News paper in 19-7-1997, A new Governmental example in the New Valley of Upper Egypt.
8. A. Elkholy, Communities in the desert - A methodology of approach - case study of the new valley zone., Unpublished Ph. D Thesis, Dept. of Architecture, Faculty of Engineering, Alexandria University, Alexandria, Egypt, (1991).
9. I. Evans, Housing, climate and comfort, The Architectural Press, London, (1980).
10. A. Hyland (ed) Al-Shahi, The Arab house, proceedings of the colloquium held in the University of Newcastle upon Tyne, 15/16 March, Newcastle, U.K., (1986)
11. H. Fathy, Natural energy and vernacular Achitecture principles and examples with reference to Hot Arid Climate, Sheater, W. and Sultan, A. (eds), The University of Chicago Press Ltd, USA, (1986).
12. I. Hamdy, "Integration of Information Technology and Environmental Attributes for planning New Settlements", in Studies in regional & urban planning, Issue 2, Feb. (1994), Athens, Greece, (1994).
13. A. Rapoport, The meaning of the built environment; a man verbal communication approach, Sage Publications Inc. California, USA, (1982).

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أسس التخطيط والتصميم للبناء في المناخ الصحراوي، حالة دراسية : جنوب الوادي بجمهورية مصر العربية

إيناس حمدى، السيد عامر

قسم الهندسة المعمارية - جامعة الاسكندرية

ملخص البحث

الاتجاه نحو الصحراء وامتداد الرقعة العمرانية يعتبر من أهم الموضوعات التي شغلت الرأي العام لفترة طويلة وبدأت مؤخرًا الخطوات التنفيذية لتحويلها إلى واقع ملموس في مشروع جنوب الوادي بتوشكي. هذه المنطقة لها طبيعة خاصة ومنساج شديد الحرارة والجفاف مما يجعل ظاهره يجب التعامل معها بحرص خاصة وان هذه الطبيعة تختلف تماما عما اعتاده أغلب القاطنين الجدد. اختيار أسس التخطيط المناسبة والتفاصيل المعمارية التي يجب ان تحقق التعامل الإيجابي مع البيئة بأقل التكاليف ودون إضافة أعباء الاعتماد على إهدار الطاقة والوارد هي السبيل إلى الوصول إلى تجميع حضري جديد ناجح. هذا البحث يهدف إلى إرساء هذه الأسس معتمداً على دراسة المشاكل المتوقعة واستعراض بعض الحلول الدراسية سواء على مر التاريخ أو حالات أخرى معاصرة لإستباط الحلول التي يجب ان يتخذي بها. الخلاصة والتوصيات تشمل المراحل المختلفة بدءاً من اختيار الموقع المناسب للتجميع الجديسد تقييم التصميم الحضري المقترح.. توزيع شبكات الطرق ومسارات المشاة والمسطحات الخضراء والمائية. تشكيل الكتلة المشيدة وتفصيل الوحدات والعناصر التصميمية المطلوب المحافظة عليها خلق تجميع ذو شخصيه متميزة.