J. Appl. Environ. Biol. Sci., 5(10S)91-99, 2015

ISSN: 2090-4274
Journal of Applied Environmental and Biological Sciences
www.textroad.com

Green Architecture a Component of Sustainable Architecture

Maryam Rezaei Moghaddam and Feridoun Nahidi Azar

Department of Architecture, Islamic Azad University, Khalkhal Branch, Khalkhal, Iran

Received: April 20, 2015
Accepted: June 15, 2015

ABSTRACT

In this study, we tried to talk about the concepts of sustainable architecture and green architecture, as a component of sustainable architecture. Today, the main pillars of sustainable development and economic progress in all areas of social, cultural, and so it is. Improve the standard of living, life expectancy, welfare, safety, etc., are totally dependent on Sustainable Development. Today, we have to move to the new concept of creating buildings with a sustainable architecture, with attention to the shortcomings and problems that we're facing them in the field of protection and efficient use of energy, and also to optimize the architecture, and the architecture of our functional needs. Green buildings are symbols of development and balance between the issues relating to environmental, economic and social health. Recently, some concepts, such as sustainable building and living buildings, have also been proposed, which according to three principles: people, planet, and socio-economic development, are being driven at all. This study is descriptive - analytical, its theoretical foundations, is based on data collected as part of the research, documentation methods, and the use of books, documents, papers and publications in the field of sustainable architecture and green architecture. The study of this chapter, the conclusion has been defined, and it has been expanded, with various principles, principles and theories of sustainable design and green architecture.

KEYWORDS: green architecture, sustainable architecture, sustainable development

INTRODUCTION

Limitless energy consumption, degradation of pastures and forests, land degradation, desertification, and the extinction of plant and animal species, they are the result of the increase in population, has led to a concern about the future of life on Earth, which Today, it has attracted the world's attention to itself, to the point where the human is forced to think about the migration of the planet, and life on other planets. The world is rapidly changing, and it seems that the great intellectual revolution, the world is going on. There is revolution in all categories and areas of science, politics, philosophy, art, technology, economics, culture, architecture, etc., in which the future is characteristic of all these movements. This is an ideal world, which has led to, global issues such as the balance of the coexistence of cultures, pluralism, coexistence of species, number of values, sustainable development and so on. Approach to sustainability, has been analyzed in various fields, following the extension, in the industrial grinding century, and sustainable development, which was introduced in the late 20th century and architecture is one of these areas. Hence, in this study, a review of approaches and strategies and explain the concepts of sustainability, is considered, in order to take advantage of it, to promote the vision of architecture, and improve the quality of living space. So, to answer the question, what is sustainable architecture? We should try to understand the basic concepts of sustainability, sustainable development, environmental issues, and sustainable architecture and finally, we must express our relationship with the traditional architectural approach to sustainable architecture. Understanding the concept of sustainable architecture, no separate understand the concepts of architecture and sustainability. Architecture is undeniable means to live, and not only build, but it is a collection of thoughts, performance and use and architectural structures, should be systematically balance and harmony in existence, not only for physical but also emotional and psychological and social life as art, and the balance, that is, homogeneity and continuity of the natural environment, not in three-dimensional assembly, they will follow the science and technology, and to find the superior energy and power in every human being. We need to look at the architecture; the quality is not understood at every moment, and its meaning, to force the brain to think. Integrate the principle of harmony and harmony between man and nature, can be a positive force, and vice versa, difference, separation, and tried in vain to overtake the others, and the natural environment, makes removing and disposal of this force. We cannot apply sustainable architecture, an architecture, when a harmonic system, ensure that the material environment, which means, what is the guarantee of rights, at all scales and concepts of Antropoloc systems nature, can help people, in order to have a stable environment. Thus, we can say that sustainable architecture is an architecture, which, in general, respect for life, and the availability of, and attention to life, not only in anthropology and natural scale, not only in the local and immediate scale, but at all scales, and those relating to the life and physical environment. (Bryan Edwards, 2014, 7)

*** Corresponding Author:** Feridoun Nahidi Azar, Department of Architecture, Islamic Azad University, Khalkhal Branch, Khalkhal, Iran

The importance and necessity

Homes and buildings alone consume one-sixth of the world's water resources, a quarter of its wood harvest and two-fifths of the world's fossil fuels and manufactured materials. In addition, buildings produce half of the world's greenhouse gases. According to statistics, the volume of construction will double over the next 20-40 years and the industry will become one of the most global industries. Pollution resulting from, incompetence, designers, and a waste of resources in the wrong projects are made by human communities, and the environment will have to be patient. Unhealthy biological systems lead to environmental pollution to humans. One of attitudes, which has led us to be indifferent, to the pollution that we consider ourselves as separate from nature, while, in fact, we are a part of nature. . Our cities, our technology, and our architecture, make this deception, in our minds that we are in control of nature, and a part of it. (Daryoosh, Babak, 2014,327)

The concept of sustainability and its objectives:

Term sustainability, in its literal meaning, focused on maintaining the situation, so that, in certain cultures, it means strong, persistent, and in English, it is meant to protect, to keep alive, and more find, and suffering. Sustenance is meant to sustain life, the self-feeding, and the strength. Sustainable, means tranquility, strength, supplier and continue. Therefore, to achieve it, the appearance of a literal interpretation, it is impossible, because, according to the second principle of thermodynamics, sustainability - in the sense of stability and maintains conditions -, the system is not accessible (Makhdoom, 2002, p. 18), and any system, whether internal or external, is always changing. Environmental sustainability, the ideal goal of sustainability, which includes three main areas interact with one another, they are, ecological sustainability, social sustainability and economic sustainability.

The concept of sustainable development:

Sustainable development is development that it has received the needs of the human being, according to the ability of future generations (Dehkhoda), sustainable development, is the kind of development that is faced with, improving the quality of human life, in the context of the capacity of supporting ecosystems, and in a more simple process definition: it is a development that improves human health and ecological systematic, long-term. Sustainable development is to offer solutions, not just the short term and the material and the physical and socio-economic patterns, which can prevent the occurrence of problems, such as the destruction of natural resources, destruction of biological systems (ecosystems), polluting global climate change and uncontrolled increase of population, injustice and low quality of human life. (Daryoosh, Babak, 2014, p. 325) The term sustainable development was discussed widely, after reports of "Brantland" The Commission, as our common future, and Summit "Rio" in 1992. Since then, people have come together to debate, what is the meaning of sustainable development in practice, and how we can achieve it (Zahedi and Najafi, 2006) Different people have different views and ideas discussed to define the concept of "sustainable development". People, have defined it, link the idea of environmental protection areas, and development, and others are known to sustainable development, in which economic development, environment, and human society have a complementary relationship , rather than competing with each other. (Baro, 1997) preserving the human environment, as a development platform, the features of all the definitions, it is possible, on the relationship between the four pillars of sustainable development, namely economic, social, cultural environmental and development (De Coster, 1997). If the balance in the mutual interaction between components dies endurance will suffer.

Concept of sustainable architecture:

The concept of "sustainable architecture", either as a creation of the human environment, and regulate the relationship between humans and the physical environment, and as a product of this process is mixed with a stable environment, and in a general context, we can interpret it, to "create a stable environment by man." Achieving the stability of the physical man-made environment, as part of the human environment, and at the receiver and the system of economic and social activity is dependent on maintaining a dynamic balance between the physical, human, learning environment, and users of space. Equilibrium dynamics depends on responsiveness and activity in the physical environment, the demands and needs of users, and the changing conditions of the learning environment (Farhoodi, 2006). In sustainable architecture, building should have an appropriate balance of the site. "Glenn Markat" Australian architect says the building should touch the ground, quiet and style. Sustainable design, it is useful to engage with nature and the earth, and sustainable architecture, must be active in order to repair, rebuild and renew the Earth's natural systems, and prudent use of natural resources and the wheel of life on Earth (Soleimani, 2008). Sustainable and ecological architecture, attention to architecture, such as a living organ, the environment, to provide for human life, as other living organisms, and it gives the identity of the built environment of space, and although it is the most advanced design and implementation techniques, apparently, it is interconnected with the principles of traditional architecture. In this sense, we can start with a review and understanding of traditional architecture, to make a living and organic architecture, and begin to respond to the needs and requirements of today's society, and translate it into modern language expression, after that (Aminzadeh, 2003)

The concept of sustainability in architectural monument:

The concept of sustainability in architecture is to create buildings that have spent much of his life just as it is possible, in a building with several hundred years of life; there is no coordination with the needs of the present. Architecture can be called as a stable, responsive to the needs of his time; in general, the concept of sustainability is rooted in three things:

1. Nature, which is the basis of any of the created space 2. Regionalism and ecology oriented 3. An approach, it does not reduce the ability of future generations, in needs, in addition to the lack of damage and injury, the environment. (Manoochehri and Shafiee 2013)

Climate attitude, there are many strategies that sustainable architecture, offers. Climate attitude, reduced man, as a creature of earth that he needs to climate comfort. Explain the climate, is one of the important pillars of Iranian architecture, making the final shape of the building, so that the human sense of participation in an atmosphere of comfort, and at the same time, he receives a message by it, within the space, (Memarian, 2008).

Principles of design and construction of green buildings:

Special features must be considered, to make buildings more environmentally friendly (green). These features are the principles governing style "Ecotechnology", which they observe, design and construction, is essential.

1. Energy saving and storage buildings are designed, with the overall objective of maintaining the non-renewable energy resources, prevent local, global, and atmospheric pollution, and also reduce the cost of energy consumption in buildings, using helpful affordable energy, and combat poverty, energy sources, energy-efficient.

2. Climate design, building design, must be done in accordance with the climate, and climate with maximum use of resources. In this regard, the following must be adhered to.

* The use of natural resources in the area, such as sunlight, soil, plants, water, and natural sites
* Correct the building, to minimize environmental impacts
* Management of water resources and efficient use of the
* Use existing vegetation, and its application in space, etc.

3. Renewable energy sources, and minimum consumption of natural resources: the threshold of the third millennium, due to the fundamental changes that have taken place in many developing and developed countries, both industrialized and economically, In particular, over the past decade, and given the outlook for the world, from the technical point of view, the issue of energy supply over the coming years, and the use of new forms of energy (solar, water, wind, earth), to as the inevitable alternative to oil and gas, is one of the most important issues that have occupied the minds of many officials and experts in different countries. In particular, it is more important, with anticipated completion of fossil fuels in the not too distant future. Accordingly, new energies, such as active and passive solar energy, wind energy, geothermal energy, should be used in building,extremely. In this regard, measures such as those listed below are applicable.

* Geothermal energy for power saving should be used
* Wind energy for air conditioning in buildings, in the event of the day, or some seasons

4. Adhere to the welfare of beneficiaries

Buildings should be designed with this view, the circumstances in which the high and favorable for consumers. To this end, some tips, it is important for the design, including:

* Maximum use of natural light in buildings
* Designed to provide comfort for building users
* Intelligent regulation of natural and artificial light
* Intelligent regulation of temperature and humidity of the atmosphere
* The use of landscaping and green space

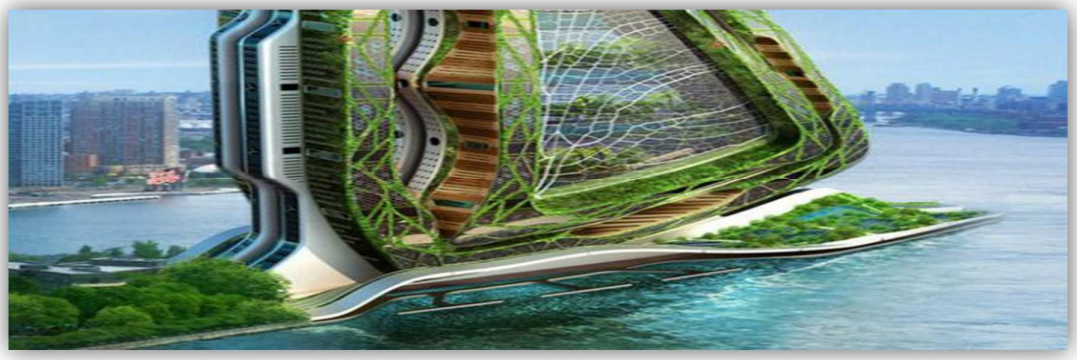
5. Compatibility with the surrounding environment and environmental sustainability: the building must be designed and constructed in order to protect the environment, and it is adapted. Materials are durable, and should be transformed in the environment easily. Some principles related to compliance and environmental sustainability is below:

* To minimize damage to the environment
* Efficient design of buildings, energy and saving it
* Designed to optimize the use of appropriate materials, to reduce the damage caused to nature
* Durable design for environmental sustainability (Daryoosh, Babak, 2004, p. 343)

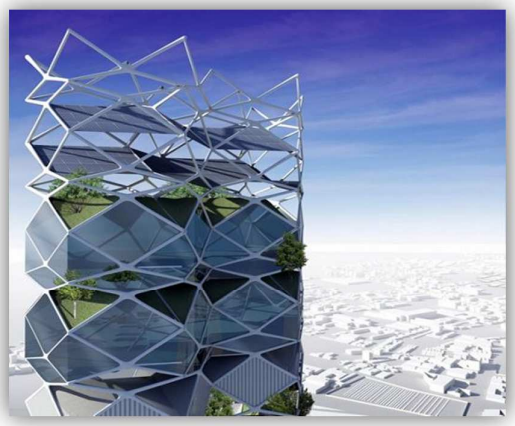
Green materials, selection and incompatibilities

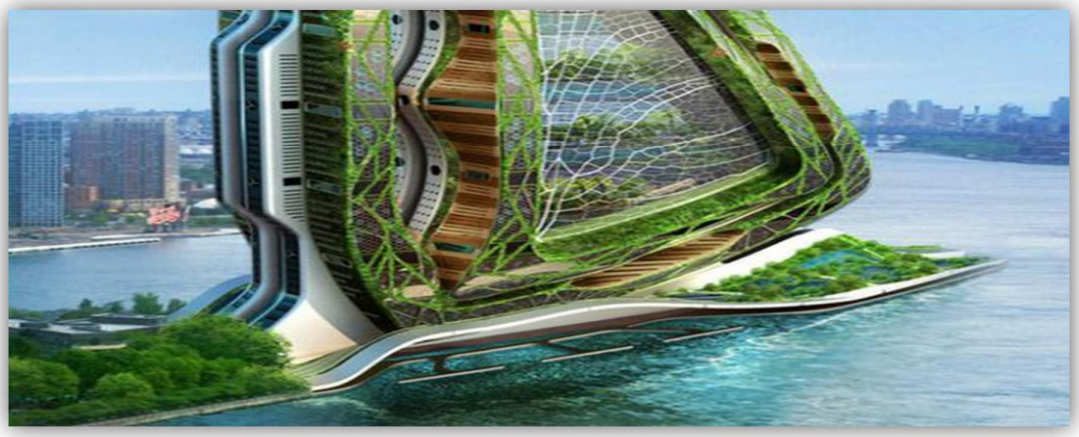
* Health in front of the ecological criteria
* Direct effects, the indirect effects
* Immediate effect, the long-term effects
* Separate measurable assessment methods, the insoluble complex measurement methods * embodied energy, the energy stored in the application * striking appearance, the critical action (Bryan Edwards, 2014, p. 120)

Samples



Solar skyscraper in Mexico City: The stunning Vertical Park, organized by George Hernandez, and is designed to infuse the city, with large green spaces. In the form of modular skyscraper, an aggregate of accumulated units of trees is made. That is, the solar system, including an elevated garden, and space for a refreshing, mining and recycling of all water. The tower is to improve living conditions, without having any negative impact on the environment, creating sufficient for agriculture in urban areas, water reclamation, and collecting solar energy are the main objectives of the project. The general form of the demonstration project, which is inspired, like fractal geometry of nature, along with green grass roof and trees in height, has created a harmonious and attractive appearance.





Design of dragonfly Tower (bionic architecture): Belgian company Vincent Callebaut Architecture, designed the tower. The group has designed a vertical farm, inspired by the wings of a dragonfly. The tower, which is located in East Roosevelt Island, New York, is a living organism; it is self-sufficient in water consumption, energy and food production. The skyscraper has 132 floors and 600 meters high, which has been adapted for the production of 28 different crops, including fruits, vegetables, grains, meat, dairy and eggs.

The vertical farm is sustainable use of organic farming, based on intensive production, which finds its diversity, according to the seasonal period. This type of farming is suitable for the design of an ecosystem, due to the reuse of biodegradable waste, and energy conservation and renewable resources. The skyscraper, nothing is wasted, and everything is in a continuous cycle. Bionic architecture of the tower shows the functional organization, that the organization is run by two symmetrical towers, around a large greenhouse climate, which is connected to it, and it does not spread, between two transparent wings, inspired by the wings of a dragonfly. The wings are bright, are made of metal and glass.

Etc.

Green roof

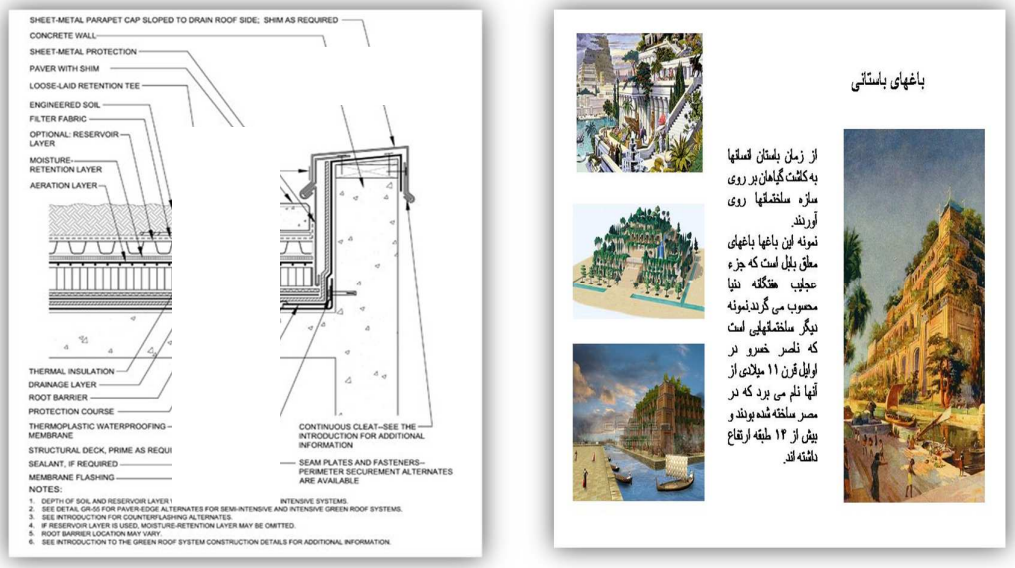
Green roofs, in fact, not new. Plants, on the roofs of buildings, at least they have a long life in the Hanging Gardens of Babylon. Green roofs, the vegetation on the roof, where the plants are used instead of some materials, such as mosaics and tiles. During recent decades, they have become popular in parts of Europe, to some extent, but they are a new phenomenon in many parts of the world. Greater use of green roofs can reduce some of the problems of modern cities. They reduce the waste of rain from the storm. They are treating rainwater, the pollutants, and reduce energy consumption. Buildings, possess, green roofs, require less heat in winter, and less need to cool in the summer, compared with buildings with conventional roofs. These buildings, in large numbers, can reduce the "urban heat island" of entire cities. (Golparvarfard, 2012)

History of green roofs:

The idea of a garden on the roof, and on its culture, is handled by the Iranians and the roof of the span of 2500 years ago, in ancient times, and then it was used in the Hanging Gardens of Babylon, by the Babylonians, Persians inspired by six hundred years before Christ.

Hanging Gardens of Babylon, respectively, the distance from the king's palace, and indeed outside the city, the gardens, are the wonders of the world and the architectural masterpieces. The gardens, which were 5 matches terrace, were built according to the order of Ninus, king of Babylon to his wife, Semiramis, near the Euphrates River.

Square stone columns, the sides are 5 m, were used to form the basis of the strength of the building. Floors were insulated by a special material to prevent the infiltration of rainwater into the lower classes. For irrigation of each of the classes (orchards), they were guided by the Euphrates water directly to them, to the highest part. (Since there are no high mountains, on the sides of buildings, the artesian property is used; it shows one of the wonders of the building) The Garden (terrace) as it was overlooking the Euphrates River and Babylon and the beautiful landscape and transit trade caravan and caravan East and West, there were then. The building was built around 600 BC. AD, but the works of its buildings are not observed and only long barrier, closed, on the Euphrates River, from its remaining bricks.



Ancient garden

Human plants planted, since ancient times. Hanging Gardens of Babylon, from the gardens, which are the seven wonders. Other examples are the buildings that Anna made by Khosrow, in the early 11th century, in Egypt, with more than 12 floors

The benefits of building green roofs:

1. Protect the shell roofs, green roofs can increase the longevity of the roof membrane, through protection against ultraviolet radiation, followed by expansion and contraction caused by thermal fluctuations. In the past, the roof must be replaced every 15 Ta20 year, but some green roofs in Germany, have lived up to 40 years, without any replacement.
2. Sound insulation, roofs covered with soil and plants, can be, insulation, and reduce the sound, so dB 18, to enter or exit the building, to the extent dB 3 or more.
3. Air and recreational space, green roofs, make improvements, beautiful and fun to make a public spectacle of cities, and the surrounding buildings, and provide green space, beautiful and fit for building users.
4. Insulation: green space, is proposed as a layer of insulation, and to prevent temperature rise buildings, in the summer months, it can reduce the demand for electricity for cooling, and green roofs, the Insulation can be important, during the winter months, and reduce the demand for heat energy, and as such, it plays a major role in saving energy.
7. lowering effects of urban heat islands: the so-called heat island effect, refers to the temperature difference between the city and its suburbs, and it can be even up to 10 ° C. Green roof, will deal with the heat island effect, by increasing the vegetation, which added to the city's landscape. Plants make their surroundings, cool, the natural cycle of evaporation and transpiration.
8. Growing edible plants, a green roof, with good design, it can be edible plants and vegetables healthy, no pollution, caused by the use of poisons and conventional fertilizer.
9. The correct air quality: green roofs, air filter, absorbing carbon dioxide and producing oxygen. 5.1 square meters of green space provides annual enough oxygen for one person. One square meter of green roof can be removed, from 0.2 to 0.5 kg of particulate matter in the air, in the year. In this way, we will, cleaner and

healthier air to breathe, and absorb and filter pollution, caused by the burning fuel product, will prevent the destruction of the ozone layer.

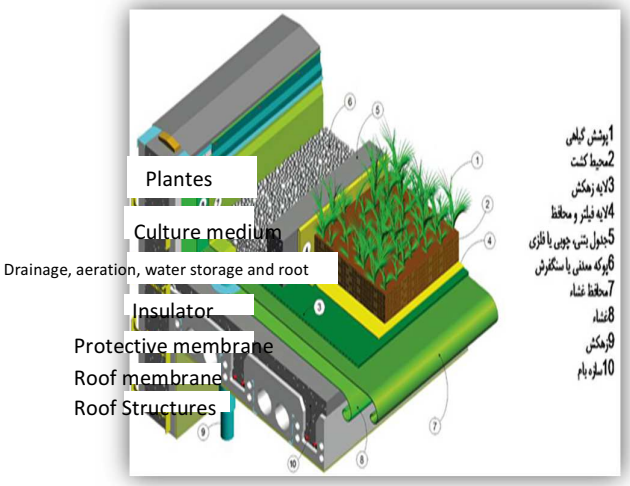
Components of green roofs

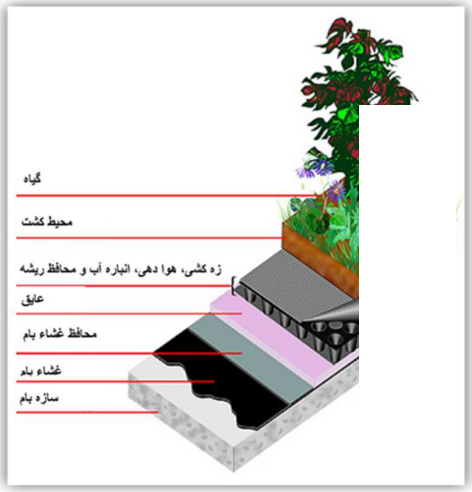
In general, the major components forming a green roof can be displayed, as shown below:

Plant- medium - Drainage - Insulation - the roof membrane - roof structures

5. The economic benefits, green roofs also reduce heating and cooling costs, will increase the value of assets, at home.

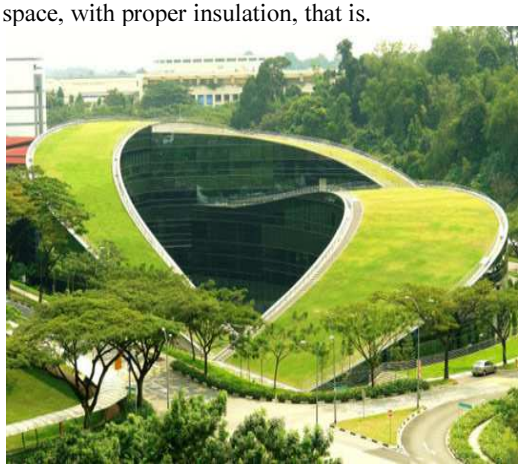
6. Mental health: to create a natural environment, green space in the urban environment, can play a significant role in the creation of relieving mental and physical health of urban residents.





1. Vegetation
2. Culture medium
3. Layer gutters
4. Filtering and shielding layer
5. Table of concrete, wood or metal
6. Asphalt roof shells
7. Protective membrane
8. Membrane
9. Drainage
10. Roof Structures

Faculty of Art, Design and Media at Nanyang Technological University in Singapore, which has been beautifully designed by CPG Consultants; these structures, collects rainwater to irrigate the surrounding green space, with proper insulation, that is.



Green walls
The effects of green wall:
A. The ecological effects
1. Reduction of noise pollution
2. Reduce Air Pollution
3. The increase in per capita green space
4. Produce more oxygen
5. Reduce dust
B. The environmental impact of spatial
1. The effect on human behavior, and mental and behavioral dynamics
2. Increase the quality of the environment

Promoting alternative energy technologies, new materials and patterns in architecture:
The use of solar energy using solar cells or solar power development in areas that have adequate sunlight
The use of wind energy, wind power plants (such as wind power in Nishapur)
Plants that use heat from the earth (in Ardebil)
The use of advanced intelligent control system, the qualities of comfort
Using recycled materials
The use of thermal insulation in the body and roofs
The use of double-glazed windows and doors, and proper sealing of all openings
The use of optical fibers to transmit light into
Advantage of using water, and filtered again, to be used as non-potable water
Waste water and use of the gases given off by, for powering through septic resources
Introduction and use of technology, and successful models, such as double features, etc
Supporting innovation, which are provided and festivals in the country
Conclusion:
If we look at the principles of sustainability and sustainable development in a city, the city will be stable, and its development will be sustainable, and titles, green and sustainable architecture, in fact, the qualities that define, There are environmental sustainability and durability in a topic or an artifact, such as a building. Therefore, design and construction, eco-friendly, sustainable and should be intelligent, to be exploited, utilizing the most advanced technologies. A sustainable, green building, not in the face of nature, but it is next to and parallel to it, and it is formed to exploit further the environmental features, and human welfare. In general, sustainable architecture refers to several fundamental points:
1. Quality orientation
2. Paying attention to the future
3. Paying attention to Environment
Therefore, sustainable design has profound implications, at its core, that is, the bond between man, nature, and architecture. And also, an architect must be completed nobles, who designed the building, so that future problems, reach the minimum. We can conclude that, structures, buildings will need to have the following three attributes: 1. Effective and efficient, 2. Maintainable, 3. Adaptive

REFERENCES

- Edward, Brian, 1944-M, guidelines on sustainable architecture, translated by I. Shahrouz Tehran, stand architecture Press, 2014.

- Amin Zadeh, B., 2003, the impact of the biology and ecology of architecture, Tehran, Quarterly Journal architecture and architecture and Culture, Number 13.

- Barrow, CJ, 1997, sustainable development, the concept of value in practice, translated by Ali Badri, Isfahan, Geographical Research Quarterly, No. 44

- Daryoush, Babak, 2014, human nature, architecture, Tehran, knowledge.

- Dehkhoda, AA, 1945, Dehkhoda dictionary, Tehran, printers National Bank.

- De Coster, Francesco, 1997, Chair of sustainable development, translation Mohsen Hakimi, the journal Nature and Resources, Tehran, Iranian National Commission for UNESCO, 7.

- Soleimani, Meysam, 2008, land and sustainable architecture, Tehran, Journal architecture and Culture, Number 33.

- Farhoudi, Marwah, 2006, based on the concept of sustainability thinking, Tehran, Journal architecture and Building, No. 12.

- Golparvarfard, Nazanin, 2009, Human Nature - Architecture, Tehran, Tahan, Fifth Edition.

- Memarian, Gholam Hossein, 2008, Introduction to typology of residential architecture introverted, Tehran, Soroush knowledge.

- Manouchehri, Maryam and Shafiei, Hamed, 2013, Iranian House of stability, Tabriz, Proceedings of the International Conference on Sustainable Architecture and Urban Development

- Vasigh, Behzad 2014, Analysis of sustainable architecture in rural indigenous housing cold climate and mountainous country, Tahan publication.

- Zahedi, Shamseddin and Najafi, Gholam Ali, 2006, Concept of Sustainable Development, Tehran, Quarterly Journal.

Websites:

www.buildsustainably.org

http://sainar.net/architecture

http://memarinews.com/Pages/Printable-News-5662.html

http://www.noandishaan.com/forums/thread93961.html

http://atr-eco.mihanblog.com/post/266

parspey.com/bamesabz.php